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China Report

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JIANGXI AGRICULTURAL GEOGRAPHY

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JIANGXI AGRICULTURAL GEOGRAPHY

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[Selections from Chinese Agricultural Geography Series entitled "Jiangxi Agricultural Geography" compiled by the "Jiangxi Agricultural Geography" Compilation Unit, published by the Jiangxi People's Publishing House.]

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JIANGXI AGRICULTURAL GEOGRAPHY

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Foreword

Acting under guidance of the Provincial Agricultural Commission and in the spirit of the notice from the former Ministry of Agriculture and Forestry and the Chinese Academy of Sciences on the compilation of "Chinese Agricultural Geographies," Jiangxi Province organized personnel concerned in the Provincial Agricultural Commission, the Water Conservancy Department, the Agricultural and Forestry Reclamation Bureau, the Department of Agriculture, the Meteorology Bureau, and the Academy of Agricultural Sciences, as well as professors from the Geography Department of East China Teacher's College to form a compilation unit for a "Jiangxi Agricultural Geography." This unit began work in October 1977. Between early November 1977 and June 1978, the compilation unit carried out wide-ranging investigation, research, and on-the-ground observations throughout the province with the vigorous support of leaders at the provincial, prefectural, municipal, and county levels. Next it concentrated on the collation of data, the writing of a first draft, and the drawing of maps. Participants in the writing of the first draft and other work included Comrades Liu Junde [0491 0689 1795], Li Tianren [2621 1131 0117], Lu Xinxian [7120 1800 6343], Hua Xicheng [5478 3556 2052], Huang Jiemin [7806 2638 3046], Wang Jia [3879 7468], and Zhang Yachun [1728 0068 5028], all of East China Teacher's College; Wu Renyuan [0702 0117 6678[of the Department of Water Conservancy; Lu Pengju [7120 7720 5282] of the Provincial Department of Agriculture and Land Reclamation; and Cai Wenhua [591 2429 5478] of the Provincial Meteorological Bureau. Comrade Guo Yaping [6753 0068 1627] of the Provincial Agricultural Commission did a large amount of concrete organizational work in the investigation and compilation process. Once the preliminary draft was completed, it was printed up and issued a total of three different times to authorities concerned in the province and prefectures for their comments. Finally, Comrades Guo Yaping, Liu Junde, and Li Tianren put the draft together, making substantial revisions and additions. Comrades Fei Dean [2431 1795 1344] of the Provincial Department of Agriculture, Zhong Shufu [6988 2885 4395] of Jiangxi Agricultural University, and Li Yisu [2621 0001 3936] of the Meteorological Bureau went over the manuscript and made corrections. Units concerned, such as the Provincial Statistical Bureau, the Department of Agriculture, the Food Department, the Department of Water Conservancy, the Cartographic Bureau, and the Geological Bureau provided a large volume of data, charts and tables for the compilation and revision of

this book. Comrades from the Provincial Agricultural and Forestry Reclamation Bureau, the Provincial Cartographic Bureau, the Provincial Agricultural Zoning Office, the Provincial Academy of Agricultural Sciences, the Provincial Cotton Research Institute, the Provincial Science and Technology Information Institute, the Geography Department of Jiangxi Teacher's College, the Prospecting and Design Academy of the Jiangxi Provincial Agricultural and Forestry Reclamation Bureau, and the Agricultural and Forestry Reclamation Bureau of Yichun Special District provided enthusiastic guidance and valuable ideas for which we express heartfelt gratitude!

"Jiangxi Agricultural Geography"is a part of the "Chinese Agricultural Geography" series. This work is divided into two parts. Part I is devoted mostly to an exposition of natural conditions and natural resources for development of agricultural production in the province, a brief history of the development of agriculture, achievements since liberation in development of agriculture, plus current agricultural characteristics and the orientation of development. Part II divides the whole province into five major agricultural regions, namely north, weat, east, central, and south Jiangxi, on the basis of natural and economic conditions, and similarities in the present agricultural situation. It makes a comprehensive analysis of these regions, evaluates natural and economic conditions and development, use of potential, and addresses itself to major problems in agricultural production at the present time. It explores the orientation and course of development with a view to being able to provide scientific data to make it possible to suit general methods to specific circumstances in the province to improve agricultural production conditions, to do rational planning and to lay out agricultural production. It also aims at laying a preliminary foundation for investigation and study of the province's natural agricultural resources, and for agricultural zoning work, making a contribution to an acceleration of the modernization of agriculture in the province. In addition, this book pulls together a large amount of material on farming, forestry, animal husbandry, sideline occupations, and fishing industry production (statistical data quoted being as of the end of 1979) for the reference of production, teaching and research units.

Since our level is not high, and since investigation and study has not been sufficiently deep or wide-ranging, inevitably the book suffers from shortcomings or even errors, criticism and correction of which is requested.

"Jiangxi Agricultural Geography"
Compilation Unit
February 1981

Part I. Overview of the Entire Province

Jiangxi is the cradle of China's industrial and agricultural armed revolution. It is located to the south of the middle and lower reaches of the Yangtze River, and it has been under jurisdiction of the western district of the area south of the Yangtze River since Tang times, hence the name "Jiangxi" [literally west of the river]. Furthermore since the Gan River is the main one in the province, the province has been called "Gan" for short. To the east, the province touches Zhejiang and Fujian provinces; it neighbors Guangdong on the south, abuts Hunan to the west, and neighbors Hubei and Anhui to the north. It is a major strategic rear area for the southeast coast of China. The province stretches from 24° 29' latitude in the south to 30° 05' latitude in the north, spanning a distance of about 620 km. It stretches from 113° 34' east longitude to 118° 29' east longitude, and is 490 km from east to west. The province totals 166,600 sq km in area, [1] which is 1.7 percent of China's total land area. This includes 38 million mu of farmland. Its population numbers 32,289,800, which is 3.3 percent of the country's total population, including an agricultural population of 27,483,600 (1979). The province is divided into six special districts including Ganzhou, Yichun, Shangrao, Jian, Fuzhou, and Jiujiang; four province-administered municipalities, namely Nanchang, Jingdezhen, Pingxiang, and Jiujiang, and the Jinggangshan Administrative Bureau. It has a total of 86 counties (and municipalities), 1,650 rural people's communes, 23,400 production brigades, 229,300 production teams, and 994 state-owned farms and state-owned land reclamation farms.

"Sixty percent mountains, 10 percent water, 20 percent farmland, and 10 percent roads and manors" summarizes theprovince's geographic outlines. The province's terrain is varied, its climate temperate and wet, and its natural resources abundant, providing favorable natural conditions for development of agricultural production. In ancient times, Jiangxi was a province with beautiful scenery and a flourishing population in which the agricultural economy was relatively well developed. It produced abundant paddy rice, oil-bearing crops, tea, hemp, wood, bamboo, fish, and crustaceans. As a result of the long reactionary rule prior to liberation, particularly the aggression of the Japanese imperalists and the oppression, exploitation and extortion practiced by the Kuomintang reactionaries, the farflung rural forests were destroyed, water conservancy projects fell into disrepair, epidemic diseases were prevalent, everywhere a scene of devastation met the eye, desolation could be found on all sides, and flood, drought and insect pest disasters repeatedly occurred, with the result that Jiangxi's agriculture languished, and production levels were extremely depressed. At the time of liberation in 1949, the province's grainfields produced yields averaging less than 250 jin per mu. The people were extremely poor and lived in dire straits.

[1] Data provided by Jiangxi Provincial Cartographic Bureau.

Following liberation, under the correct leadership of the CPC Central Committee and Comrade Mao Zedong plus the direct leadership of the Provincial CPC Committee, the people of the whole province carried forward revolutionary traditions, struggled arduously, and strove to revive and develop agricultural production, scoring very great achievements. Between the period immediately following liberation and the 1960's, agricultural production achieved substantial development. Between 1950 and 1965, the gross output value of agriculture averaged 5.2 percent each year, and gross output of grain averaged a rapid 4.7 percent growth annually. During the 30-year period between institution of state monopoly purchase and marketing of grain and oil-bearing crops in 1953 until 1965, an average of 1 billion-odd jin of trade grain and as much as 10 million jin of fats and oils were turned over to the state each year. In southeastern China, Jiangxi stands second only to Fujian Province as a major area for the production of timber and bamboo. Annually, it ships out a steady flow of more than 1 million cubic meters of timber and more than 5 million stalks of moso bamboo [Phyllostachus pubescens], and it also has the country's second largest area of tea oil forests. In aquatic products, it stands as one of the major provinces for the freshwater fishing industry in the country. However, just when the people of the whole province were courageously advancing along the great road of socialism, development of agriculture, as did the entire national economy, sustained serious devastation as a result of the 10 years of turmoil caused by the ultra-"leftist" line of Lin Biao and the "gang of four" as a result of which many production sectors stagnated or declined.

Toppling of the "gang of four" greatly emancipated productivity. Under the leadership of the CPC Central Committee, and particularly following the Third Plenum of the 11th CPC Central Committee, accompanying a shift in the work emphasis of our party and country and as a result of implementation of "Decisions On Various Problems Pertaining to Hastening of the Development of Agriculture," formulated by the party, the party's various economic policies for rural villages were implemented, order was brought out of chaos, and thoroughgoing reforms were carried out. The enthusiasm for production of the broad masses of cadres and people reached unprecedented heights, and agricultural production revived and developed rapidly. Later on in 1977 and 1978 when bumper agricultural harvests were reaped by triumphing over 2 consecutive years of drought disasters such as have rarely occurred in history, an all-round increase in output was won again in 1979 as farming, forestry, animal husbandry, and sideline occupation production set all-time high records. During the past 3 years, development of the rural economy throughout the province has surpassed that of the past 10 years. Gross output value of agriculture has averaged 7.4 percent annually, and gross output of grain has grown rapidly at an average 8.2 percent annually. Both commune member earnings and standards of living have seen substantial improvement. Throughout the farflung rural villages, a prosperous, growing and flourishing situation has come into being.

Chapter 1. Agricultural Evaluation of Natural Conditions and Natural Resources

Jiangxi is a province dominated by hills and mountains. Mountains encircle it on the east, west and south, with rolling hills in the middle. In the north lies the country's largest freshwater lake, Boyang Lake, and its surrounding plain. They lay of the land is high in the south and low in the north. It tilts gradually inward and from south to north in the direction of Boyang Lake. People frequently call Jiangxi a red basin that opens to the north. Streams crisscross the province, and the largest river, the Gan, traverses the province from south to north. The Fu, Xin, Rao, and Xiu rivers follow the lay of the land to enter Boyang Lake from the east, south and west. The climate is temperate and moist; the four seasons are clearly defined; and natural resources are extraordinarily plentiful. The nearly 170,000 sq km of land supports more than 38 million mu of farmland that grows diverse crops such as grain, cotton, oil-bearing crops, hemp, sugarcane and fruit. Several tens of million mu of mountainlands and hills are covered with abundant forest trees and moso bamboo, and they grow cash-crop trees such as tea and tea oil. Large tracts of grassy mountains and grassy hillsides are fine ranges for the raising of herbivorous livestock such as cattle, sheep and goats, and rabbits. There are more than 25 million mu of rivers, lakes, ponds and reservoirs to which more than 100 species of fish return for spawning and in which many kinds of aquatic plants and animals grow. In addition, more than 10 million mu of wastelands may be developed for us. In short, Jiangxi Province has surpassing natural conditions in the southern part of the motherland, and it is one of the provinces holding tremendous potential for development of agriculture.

First Section. Agricultural Evaluation of Major Types of Landforms and Mineral Resources for Making Fertilizer

1. Introduction

Jiangxi is a major integral part of the country's southern hills. Within the province lies a 59,954 sq km mountainland area more than 500 m above sea level. This is 36 percent of the province's total land area. The hill area between 300 and 500 m above sea level amounts to about 30,729 sq km, or about 18 percent of the province's total land area. If these two areas are grouped together under the term mountain region, their area amounts to 54 percent of the province's total land area (See Table 1-1).

Table 1-1 Makeup of Terrain Types in Jiangxi Province

Type	Absolute Height	Relative Height	Area (sq km)	Percent of Total Area of Province
Mountains	$>$500 m	$>$200 m	59,954	36
High hills	300–500 m	200–300 m	30,729	18
Low hills	100–300 m	50–200 m	39,465	24
Plains	$<$ 100 m	$<$ 80 m	36,356	22

[Table 1-1 continued from previous page]

Provincewide totals:	166,604 [sic]	100

Source of Data: Figured from data contained in the 1:500,000 "Jiangxi Topographic Map" prepared in 1975 by Regional Geological Survey Brigade of the Jiangxi Provincial Geology Bureau.

The topography of the province is characterized as high around the outside, low in the middle, and tilting toward the north in the shape of a basin. Related to this is the not very regular general circular shape of the various kinds of terrain. Moving outward from the center of the circle (i.e., from the wide expanse of the misty Boyang Lake), the progression is as follows: (1) the Boyang Lake plain, the plain interspersed with terraces. This is a vast area of flat land interwoven with rivers and lakes. It is a fertile plain that is rare not only in Jiangxi but in south China as well. (2) The south central hills of Jiangxi, which are inlaid with numerous mountain basins and valleys. (3) The mountainlands around the edges of the province to the northeast, east, south, west and northwest. The structure of most of these mountains is basically a repeating anticline extending in a northeasterly to southwesterly direction. The direction of orographical lines generally converges with the direction of structural lines, anticlines forming mountains and synclines forming valleys, mountains and valleys alternating and a network being rather apparent. Most of the rock formations have been formed from Paleozoic metamorphic rock, with the core rock commonly being granite, which has often formed lofty mountains more than 1,000 meters high. The province has a fairly complete range of topographic types. Basins and valleys are found widely, and this helps the all-round development of farming, forestry, animal husbandry, sideline occupations, and the fishing industry. The province has been richly endowed particularly with mountain forests, arable land and bodies of water. Furthermore, the circular structure and pattern of distribution of these land forms has also deeply influenced and restricted land use and regional patterns of agricultural production in this province.

2. Major Types of Landforms and an Agricultural Evaluation of Them

The types of terrain in the province may be divided into terms of elevation into medium mountains, medium-low mountains, low mountains, high hills, low hills, high ridges, low ridges, terraces and plains. Each type may be subdivided on the basis of different kinds of rock and shapes into various fairly complex types. However, the factors within a not very large sphere that can give rise to regional changes in water and heat conditions that thereby affect agricultural production are principally elevation above sea level and relative elevation. On the basis of the province's actual circumstances, altitudes that have substantial affect on agricultural use and patterns may be generally summarized in the following several types:

A. Mountains (including medium and low mountains): Most of the mountains in the province are found around the edges of the province, where they frequently serve as provincial boundary mountains and watershed ranges. The orientation of mountain ranges is mostly northeast by southwest, and they control development of the major water systems and basins in the province. Most of the mountainlands in the province have been formed from ancient metamorphic rock formations and from granite. Because of the geological historical period and the violent tectonic activity, jointing is particularly well developed. In addition, as a result of moisture and heat, weathering and erosion has been extremely strong, with the result that mountain peaks have largely become craggy, and accumulated debris on escarpments is fairly deep. However, because of the effects of various factors, the mountainlands differ from one place to another.

1. Northeast Jiangxi and East Jiangxi Mountainlands. The rock that makes up the Huaiyu Mountains of the northeast is mostly red sandstone shale, which is fairly loose in texture and prone to weathering and scouring. As a result of its long natural corrosion, a low mountain terrain has come into being that is interspersed with prominent rock mountains and arched caves. Except for individual mountain peaks that may reach a height of more than 1,000 m, mostly are only about 500 m high. Along the eastern border between Jiangxi and Fujian provinces lies an extension of the Wuyi Mountains that run north and south for about 500 km. This is a tremendously folded mountainland, with most of the core of the mountain mass being hard and corrosion-resistant granite rock that makes the mountain landscape imposing. One of these mountains is Huanggang Mountain at an elevation of 2,157.7 m on the border between Yanshan County and Chong'an County in Fujian Province. This is the highest peak in the province. In addition, red sandstone is found fairly widely in the Wuyi Mountains. As a result of a long period of corrosion, frequently sandstone peak forests have formed. Though the terrain in all of northeastern Jiangxi and in the mountains of eastern Jiangxi is high and steep, in between are numerous cols and passes that facilitate communication. Mountain valleys frequently parallel ranges, and are where cultivated land is concentrated.

2. Southern Jiangxi Mountainlands. This includes Dayu Mountain and Jiulian Mountain in the Nanling range. These mountains are fairly broken up, most of them being at an elevation of only 600 to 800 m above sea level. Among the mountains numerous basins, valleys, and passes occur at a fairly low level of between only 300 and 400 m above sea level. This is also where most of the cultivated land is found.

3. Western Jiangxi and Northwestern Jiangxi Mountainlands. The towering and craggy Mufu, Jiuling, and Wugong mountain ranges of northwestern and western Jiangxi are a series of parallel mountain ranges formed mostly of ancient metamorphic rock and granite that run in a northeast by southwest direction mostly at an elevation of 1,000 m above sea level, but with some peaks higher than 1,500 m. In the valleys of the upper

reaches of the Xiu, Jin, Yuan and He rivers found among these mountainlands, the elevation above sea level is relatively low and frequently these are the places where cultivated land is concentrated and agriculture relatively well developed. Wanyang and Zhuguang mountain ranges (which together with Wugong Mountain form the Luoxiao Range) meander toward the southwestern part of the province and are made up largely of granite. These mountains are steep and lofty at an elevation above sea level averaging between 1,000 and 1,500 m, with individual peaks reaching a height of more than 2,000 m above sea level. The famed Jinggangshan is located at the northern end of the Wanyang Mountains.

Mountain temperatures decrease as elevation rises. Places at an elevation of more than 600 m above sea level have fairly low temperatures, and it is difficult to grow double crops of rice. Mountain river valleys are mostly upper reaches river valleys where the valleys are deep and narrow, with little and scattered cultivated land consisting mostly of alluvial fields, sunken fields, and fields on the banks of mountain streams. Since the mountains are high and the water cold, and since the soil is flood irrigated for long periods with cold water from mountain springs, there are numerous cold, watterlogged low-yield fields. Since air temperature is relatively low as well, making farming difficult, crop yields per unit of area are fairly low. However, the cool mountain climate and the relatively great amount of moisture favors growth of forest trees. Forest resources are plentiful, and it is here that the province's principal forestry bases are located. Low mountain areas provide favorable conditions for the growing of cash crop forest trees such as tea. Potential for production of first-quality tea and tea oil is very great. Large areas of grassy slopes and grasslands among forests in the mountains are fine ranges for development of animal husbandry with the raising of cattle, sheep and goats. In addition, the mountain regions contain plentiful reserves of water power, and have fine natural dams, which favor development of hydropower enterprises.

B. Hills. The form of terrain type is found over a fairly wide area in the province, and is particularly widespread in the basins of the Gan and Xin rivers. Since the rock that makes up the hills is mostly soft and loose red sandstone shale and some phyllite from the Tertiary Period that has undergone a long period of weathering and corrosion, most of the hills have a low and rounded shape and are mostly 200 m above sea level. Some high hills near mountainlands are about 300 to 500 m above sea level. Relative elevation of hills is generally only between 50 and 80 m except for some in the south that have a relative elevation of more than 100 m. In central and northeastern Jiangxi hill regions, in particular, river valleys are broad and gently rolling, and the extent of reclamation and cultivation of wasteland is fairly high. Generally speaking, the elevation of high hill regions is lower than that of mountainlands and heat conditions are better. These hills also receive water from the mountains and have the requisite conditions for the building of reservoirs and ponds. Conditions are favorable for development of farmland and cash crop forest production. They have frequently

become major production bases in the province for the farming industry, for cash-crop forest trees, and for tea. Low hills below 300 m above sea level have gentle slopes and little difference in relative height. But the land is rather broken up and frequently lacks good conditions for the building of reservoirs, so it is hard to impound runoff. In addition, since they are fairly far away from water from mountain regions, water diversion is also difficult and frequently serious droughts that are extremely bad for agricultural production occur each summer and autumn. The land has yet to be fully reclaimed for agricultural use, and there is considerable wasteland that can be developed for use.

Numerous basins are sandwiched among the hills. Most such basins are elongated bands in which the land is low and flat. They vary in size, fairly large ones being the Ji'an and Taihe basins, the Ganzhou Basin, and the Yudu, Ruijin, Xingguo, Ningdu, Nanfeng and Guixi basins. Usually a stream flows through them, forming a gently sloping broad valley and developing a small alluvial plain on which the soil is fertile. These are the places in the hills where grainfields may be found in profusion, and where farming is well developed.

Farmland in the province's hill region consists mostly of fields along the banks of streams and fields in dales, with some sunken fields. Most have been formed out of ree soil, and crop yields are fairly low. However, the growing of dryland crops and of cash forest crops, such as tea oil, is fairly widespread, and the hill region is frequently the one in the province in which farming and forestry are of equal importance. For historical reasons, the ground cover in this region has been seriously damaged, and a proportion of surface material is loose. This, plus irrational reclamation of the soil for farming in some places, has produced fairly serious erosion, which is most conspicuous particularly in Xingguo and Ningdu counties in southern Jiangxi. Serious erosion has usually occasioned a series of ecological changes that are unfavorable for agricultural production and that have become conspicuous problems for development of agricultural production that await conscientious solution.

C. Plains. This region may be divided into two types as follows: One is river plains tucked in among mountainlands and hills plus alluvial plains in basins, and the other is the lacustrine plain and alluvial plain of Boyang Lake, the latter type predominating.

The Boyang Lake plain is actually a basin. It, plus two lake basins, form subsidence lowlands in the middle reaches of the Yangtze River and have been formed by silt deposits from the Yangtze and from the province's five large rivers. The Boyang Lake plain begins in the north at Jiujiang and Duchang and extends westward to Xinyu and Shanggao. It goes as far as Xin'gan and Linzhou in the south, and to Yingtan and Jingdezhen in the east. It is narrow in the north and wide in the south and covers an area of almost 20,000 sq km. Here the plain intersects low hills and downlands. The terrain is low and flat, most of it below 50 m above sea level with a relative rise and fall of no more than about

20 m. Only at Lushan and Xishan are there individual lofty peaks protruding above the plain near Beiyu and Nanchang. In the delta region where the lower reaches of various rivers empty into Boyang Lake, in particular, where elevation above sea level is only 15 to 25 m and the relative difference in elevation is no more than several meters, rivers branch and intertwine to form a dense water network; lakes dot the landscape like stars in the heavens, and water and soil resources are even more plentiful. The entire surface of the Boyang Lake plain is mostly covered with Quarternary Period red soil and recent alluvium from rivers. The Quarternary Period red soil has been cut by streams into undulating tablelands. In lakeshore areas, lake field flatlands below 20 meters above sea level are widely developed. Some of the lowest of these lake fields are seasonally under water for a fairly long time. Flatlands include sand spits and grassy flats. Lake grasses proliferate on the latter, and the land is somewhat higher than for lake fields. Nevertheless, during the April to June rainy season each year, they are also inundated with flood waters for a short period of time. During the dry season, lake grasses grow in profusion on lake shores. These places become major local bases for the harvesting of grass for composting into fertilizer, for the grazing of livestock and for the collection of farmyard manure. In some places, reeds grow in profusion providing a natural source of supply for development of a paper making industry in the province. Lake fields and flatlands are all formed from river and lake silt, which is rich in organic matter, phosphate, potash and such nutrients. The soil is relatively fertile, and were it possible to do comprehensive planning to maintain ecological balance and to build further, improve dikes, and increase ability to withstand floods and drain waterlogging while using Boyang Lake in multiple ways, the lake fields and flatlands could become economically diversified bases for agriculture, animal husbandry, sideline occupations and the fishing industry.

The plains roll gently and the soil is concentrated in continuous tracts, which favors development of irrigation and machine farming. The plains are the main base for agricultural production in the province. The Boyang Lake plain, in particular, is the most prolific agricultural area in the province. However, problems exist with the province's plains in their being generally flat but not completely flat. Irrigation requires that the surface of the land not vary more than 0.2m in height. If it does, the land must be leveled. Requirements for paddyfields are even higher. As far as the Boyang Lake plain is concerned, the delta area in which individual rivers converge is intertwined and complex. The water system is extremely chaotic and the sand flats, grassy flats, lowlands, lakes and marshes formed in the process of delta development, as well as the portion of high land made up of former natural embankments and remnant hills are scattered about in confusion. A welter of numerous manmade land forms including dikes and ditches make the microlandscape extremely complex. This microlandscape plays a very great role in differentiating water and heat conditions, and must be considered by suiting general methods to specific circumstances when used for agriculture.

Additionally, though the gentle slope of the plain favors farming, no fundamental improvement has yet been made in water conservancy conditions; consequently flood prevention and draining of waterlogging is a fairly arduous task. With each high-water season, each of the streams that empty into Boyang Lake regularly discharge a large volume of runoff. The water in the lake rises; the rivers jostle each other, and serious flooding occurs. Many lowland areas are unable to drain stagnant waters expeditiously, so waterlogging occurs. This problem awaits unified planning for solution.

Currently, the cultivated land in the province's plains areas may be divided largely into river floodplains and primary terraces; (which the masses call "tracts"), which are found mostly on the plains of the Gan and the Fu rivers and in river valley plains of major streams. Second is the dike fields around Boyang Lake, which are the product of the working people who have enclosed portions of the lake to make fields over a long period of time. As silting has spread on the lakeshore palin, many old diked areas have gradually become independent of the influence of lake waters, and large tracts of cultivated land have come into being. Many diked areas still depend on dikes for protection, and independent water conservancy systems have been formed within diked areas. In the historical process of building dikes to reclaim fields from the lake, no attention was given to keeping the ground at a uniform height. As a result, after the diked fields were joined in continuous tracts, fields were of unequal height and this caused problems for rational crop patterns. Water levels in Boyang Lake differ widely between the flood season and the dry season. The difference between highest and lowest water levels over the years at Xingzi, for example, has been 14.7 m. With each dry season, large tracts of beach flats emerge all around the lake, and it is frequently possible to grow a late crop of paddy rice on these beach flats (lake fields). As for the fairly extensive area of red soil remnant hills, since sufficient water is not available and since conditions for building reservois are lacking, the threat of drought is omnipresent. In addition, red soil has rather poor tilth and it is not used to the full. Overall, with progress in the dredging of river channels, readjustments to the water system and improvement of diked areas, and with development of the red soil downlands of the Boyang Lake plain, considerable potential still exists for expansion of the farming area.

3. Mineral Resources for Making Fertilizer and Their Distribution

Jiangxi Province may be divided into different types of structural areas resulting from the earth's formation, and the history of geological development of each area is fairly complex. In an overall sense, however, the province has fairly complete strata in which outcroppings of pre-Sinian period metamorphic rock are most widespread, followed by Paleozoic era strata. Mesozoic era strata are fairly well scattered. Movement of the earth's crust has been fairly violent, and both volcanic activity and magma intrusions have been very frequent, providing extremely vavorable conditions for mineral formation. Mineral resources are

extraordinarily plentiful; take minerals used to make fertilizer and pesticides, for example. Incomplete statistics show about 10 different ones. In addition to coal resources, which are found everywhere and reserves of which are substantial, there is also potash, troilite (pyrite and magnetic pyrite), potash feldspar, limestone, dolomite, gypsum, arsenic, serpentine, olivine, barite, marl, talc and fluorite. Their distribution is generally as follows:

Potash: Most of the province's phosphorite contains phosphate nodules that were produced in sedimentary rock, and which are particularly plentiful in sedimentary strata formed during the lower Cambrian period. These strata are found in northeastern Jiangxi, in the basin of the Xiu River, and in western Jiangxi, and are concentrated particularly at Shangrao, Guangfeng, Yushan and Dexing. Estimated reserves total more than 100 million tons.

Potash feldspar: This is the principal raw material used to make potash fertilizer. Most of it is found in areas of acidic granite and pegmatite. It is distributed in many parts of the province, most of it in southern and eastern Jiangxi and in the area around Fuzhou. Long-range reserves are estimated at more than 80 million tons.

Pyrite: This mineral has wide applications. It is a main raw material for making ammonium sulfate and calcium superphosphate, and it is found virtually everywhere in the province, but particularly in Pingxiang, Wanzai, Yichun, Shanggao, Gaoan, Ruichang, and southern Jiangxi. Proven reserves amount to about 50 million tons, and long-range reserves have been estimated at an additional more than 50 million tons.

Serpentine, olivine, and talc: These are important raw materials for making calcium magnesium phosphate fertilizer. Mostly they are found in areas of deep faulting where ultrabasic rock is found, including particularly large concentrations from Wuyuan through Dexing to Yiyang in the deep fault zone of northeastern Jiangxi. The province's long-range reserves have been estimated at several hundred million tons.

Limestone: Limestone is found virtually everywhere throughout the province, with most of it in Pingxiang, Yichun, Yushan, Shangrao, Leping, the basin of the Xiu River, and in southern Jiangxi. Its calcium oxide content is about 45 to 50 percent; it is fairly pure, and reserves are very large.

In addition, gypsum is produced mostly in the Jitai Basin; barite is found at Fuzhou and in southern Jiangxi; most fluorite is found in the Jiujiang and Shangrao areas; and marl is found everywhere in the province. Bone coal and hypersthenite may also be used to make fertilizer and are found over a fairly wide area.

Except for limestone, which has been developed for use everywhere, and phosphate, which is mined fairly extensively, development of all the other minerals is currently very scattered because deposits are of low grade or they are of no value for exploitation.

Second Section. Agricultural Evaluation of Climatic Conditions and Climatic Resources

Jiangxi Province is located north of the Nan Range and south of the Yangtze River at a rather low latitude and not very far from the sea. In winter, it is frequently affected by cold high pressure from Siberia (or Mongolia), and the prevailing wind is from the north. In summer, the province is mostly controlled by subtropical high pressure, and the prevailing winds are from the south. As spring turns into summer, cold and warm air currents intermingle in the province bringing continuous rains during April and May. When summer turns toward fall and a single air mass envelops the province, days are clear, hot and with little rainfall. Overall, the province's climate is temperate, rainfall copious, the summer and winter seasons long, and the spring and autumn seasons short. It is characterized by a subtropical moist climate, which provides outstanding natural conditions for development of agriculture.

1. Energy Resources and Production Potential

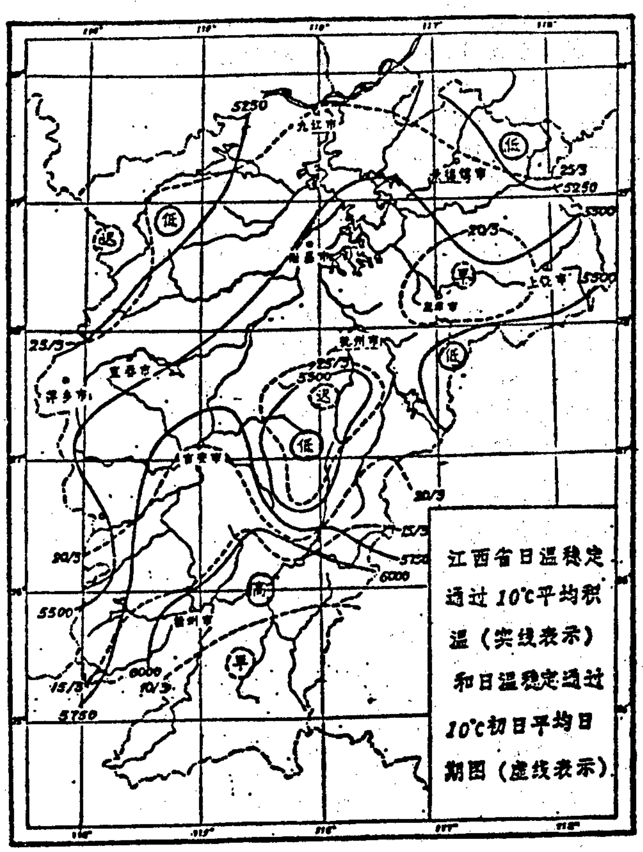
The amount of sunshine and the extent to which light energy is used are major factors affecting crop production. Sunshine for the whole year in Jiangxi Province averages between 1,500 and 2,100 hours, with eastern Jiujiang Prefecture, Jingdezhen City and northern Shangrao Prefecture getting relatively more with 1,900-odd hours. This includes Duchang County, which receives 2,085 hours. Western Yichun Prefecture and Pingxiang City get somewhat less at under 1,600 hours, including only 1,488 hours at Tonggu. Generally speaking, mountain regions get relatively less sunshine. For example, Chongyi gets only 1,482 hours. The average amount of sunshine for the province each year is between 34 and 47 percent, with an overwhelming majority of places receiving more than 40 percent.

2. Abundant Heat Resources

Jiangxi Province also has relatively plentiful heat resources. Annual temperature averages 16.3° - 19.5°C, generally rising from north to south, and plains areas warmer than mountainlands. In the mountain regions of northwestern Jiangxi and along the south bank of the Yangtze River, temperatures are relatively low, averaging an annual 16.3° - 17.5°C. Temperature is highest in the southern Jiangxi basin where annual temperature averages 19.0° - 19.5°C. At most other places, temperatures average 17.0° - 19.0°C.

Throughout the province winters are warm and summers hot. The frost-free period is 240 to 307 days long. In northeastern and northwestern Jiangxi, the average frost-free period ranges from 240 to 250 days. In southern Jiangxi, it is between 280 and 300 days. In other areas, it is 260 to 290 days. The first frost comes fairly early in northern Jiangxi and in mountain areas (mid-to late November), and in southern Jiangxi, it comes relatively late (early to mid-December). Winter frosts end early in southern Jiangxi, taking place in February. In northern Jiangxi and in mountain regions, they end in early to mid-March.

The active growing season (i.e., the continuous period when average temperatures are stabilized at 10°C) lasts for 260 to 270-odd days in southern Jiangxi, and active cumulative temperature reaches more than 6,000°C. In northern Jiangxi, the active growing season is about 240 days in most places, and active cumulative temperature reaches 5,000° to 6,500°C. In other places, the active growing season is about 250 days and the active cumulative temperature is between 5,500° and 6,000°C.



Average cumulative temperature when daily temperature is stabilized at 10°C in Jiangxi Province (represented by solid line).

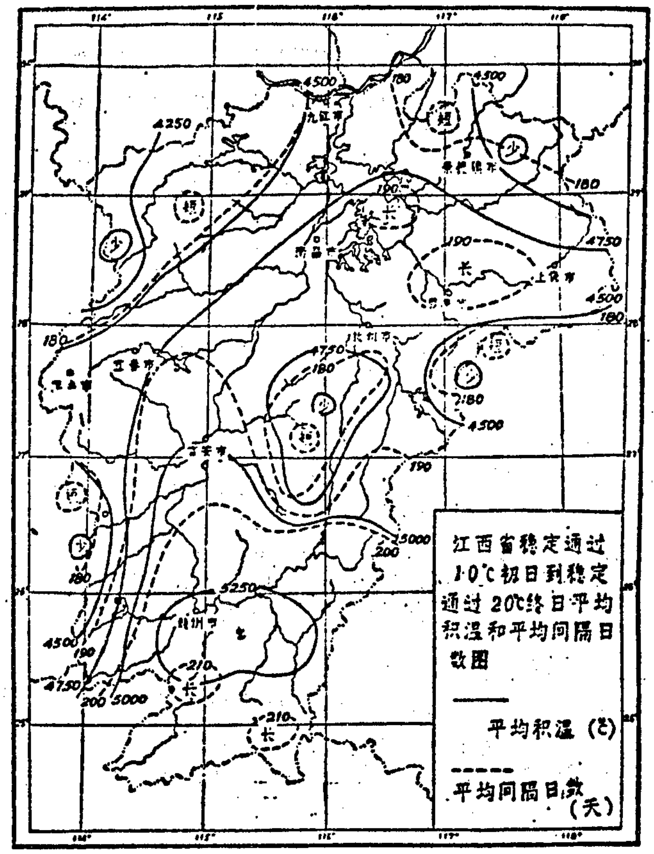
Average date on which daily temperature is stabilized at 10°C (represented by broken line).

Clearly the province has relatively abundant heat resources, and in an overwhelming majority of places the frost-free period is long, the active growing season is long, and cumulative temperature is high, which is very favorable for a three-crop system in which the growing of two paddy crops predominates, and for the growing of heat-loving subtropical cash-crop trees, such as tea, tea oil, tung oil and citrus fruit. Certain tropical and southern subtropical crops such as lemongrass, sisal hemp, and cassava can also be grown in some basins in southern Jiangxi. However, vertical changes are great in climate in mountainlands; general methods must be suited to local circumstances and matters handled according to climatic patterns.

3. Ample Precipitation

The province averages 1,350-1,940 mm of precipitation annually. It is one of the provinces in the country receiving most rainfall. In terms of regional distribution, annual average amount of precipitation may be expressed as follows: Much in the south and little in the north, and much in the east but little in the west; much in mountainous regions and little in basins. The Wuyi Mountains, the Huaiyu Mountains, and the Jiuling Mountains are three of the areas of heaviest rainfall in the province. At the center of heavy rainfall, precipitation averages 1,700-1,900-odd mm in most places. The area near Pengze on the south bank of the Yangtze, and around Taihe in the Jian Basin are scant rainfall areas. At the center of the scant rainfall area, annual precipitation averages 1,350-1,400-odd mm. Most other places get 1,500-1,700 mm.

Jiangxi Province's climate is greatly influenced by monsoon winds. Usually warm, moist summer monsoon winds begin to prevail around April each year, and the volume of rainfall gradually increases. During May and June, cold and warm air currents regularly intermingle in the province and the amount of precipitation spurts. Average monthly precipitation may reach 200-350 mm, and in years of heavy rainfall it may reach 700 mm in some places. Since the period July to September is commonly controlled by subtropical high pressure, there is scant rainfall except for local thunder showers and occasional typhoon rains. Monthly volume of precipitation averages less than 100 mm for the most part. The month of least rainfall all year is usually December or January when monthly volume of precipitation averages only 40-60 mm. In years of slight rainfall, individual places may even receive no rainfall at all for a whole month.



Average cumulative temperature and average number of days of intermittent sunshine from the first day when temperature is stabilized at 10°C until the last day when temperature is stabilized at 20°C in Jiangxi province.

——————————is average cumulative temperature (°C)

----------------is average number of days of intermittent sunshine.

The foregoing shows an uneven seasonal distribution of the annual amount of precipitation in the province. Average volume of rainfall between January and March is about 16 to 21 percent of the total for the year. Average volume of rainfall between April and June is about 42-53 percent of the total for the year. Volume of rainfall between July and September averages 18-27 percent of the annual total amount; and between October and December precipitation averages 10-15 percent of the annual total. (See Table 1-6)

表1—6 江西各地降水量及占全年降水量百分率

k) 项目 \ a) 地名		b) 九江	c) 修水	d) 景德镇	e) 南昌	f) 贵溪	g) 宜春	h) 吉安	i) 赣州	j) 龙南
l) 全年降水量（毫米）		1370	1563	1687	1522	1791	1582	1438	1431	1519
m) 1—3月	n) 降水量	270	285	336	288	366	334	274	279	257
	o) 占全年百分率	19	19	20	19	20	21	19	19	17
p) 4—6月	n) 降水量	588	757	818	807	876	706	678	658	717
	o) 占全年百分率	43	48	49	53	49	45	47	46	47
q) 7—9月	n) 降水量	325	325	344	269	363	320	301	304	379
	o) 占全年百分率	24	21	20	18	18	20	21	21	25
r) 10—12月	n) 降水量	188	186	188	159	198	221	185	191	166
	o) 占全年百分率	14	12	11	10	11	14	13	13	11

此外，降水量的年际变化也很大，如多雨的1954年降水量多达1429～2736毫米，少

Table 1-6 Amount of Rainfall at Various Places in Jiangxi and Percent of Total Annual Precipitation

Key:
- a) Place
- b) Jiujiang
- c) Xiushui
- d) Jingdezhen
- e) Nanchang
- f) Guiqi
- g) Yichun
- h) Ji'an
- i) Ganzhou
- j) Longnan
- k) Particulars
- l) Annual volume of precipitation (mm)
- m) January to March
- n) Amount of precipitation
- o) Percent of annual total
- p) April to June
- q) July to September
- r) October to December

In addition, year to year changes in the amount of precipitation are great. For example, in 1954, which was a year of much rainfall, precipitation amounted to 1,429-2,736 mm; in 1963, which was a year of slight rainfall, precipitation amounted to 898-1,360 mm, a difference of virtually 100 percent. During the great drought in northern Jiangxi of 1978, Jiujiang received only 868 mm of rainfall, making it the greatest drought year since 1934.

Total volume of precipitation in Jiangxi Province may be said to be copious and is able to satisfy the need for moisture of all kinds of farm crops. However, because of the uneven seasonal distribution of precipitation and the substantial variations from one year to another, drought and flood disasters have regularly occurred historically. With

the development of water conservancy projects following liberation, the situation has vastly improved; nevertheless, cure of the root causes of drought and flood disasters is still a long way off. If there are to be further consistently high yields in agriculture, in view of the character of the province's climate, it will be necessary to carry out a program that emphasizes the storage of water and that devotes attention both to fighting drought and drainage of waterlogging.

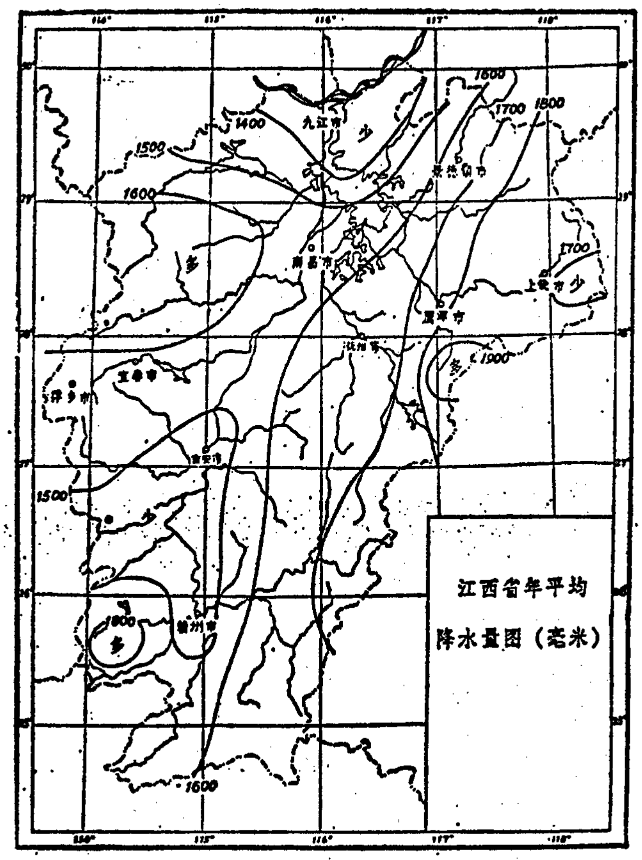


Figure Showing Average Annual Amount of Precipitation in Jiangxi Province (mm)

Though the province's climatic conditions are superior; nevertheless varying degrees of calamitous weather may occur each year. It is necessary to understand fully the changing patterns of the occurrence and development of such weather and to take various measures to improve capabilities to withstand it. The principal kinds of calamitous weather in the province are as follows:

1. Spring cold. Between March and April every year when spring returns to the land, temperatures rise markedly throughout the province. In southern Jiangxi, from the end of the first 10 days through the second 10 days of March, the daily average temperature is stabilized at above 10°C, and temperature conditions required for the sowing of warmth-loving crops such as paddy rice and peanuts begin to be provided.[2] However, at this time the force of cold northern air has not yet been fully spent, and it may continue to invade the province. Once the cold air arrives, temperatures may drop to below 10°C, and frequently high winds or rain (sleet, in some years) accompanies the drop in temperature, and there is little sunshine. Overcast and cold weather that continues for more than 3 days, may be unfavorable for sowing and growth of early rice crop seedlings, and seeds or seedlings may rot and plants die. The masses call this rainy, overcast and low-temperature weather that is bad for spring sowing "the spring cold."

The Qingming cold usually appears during the first 10 days of April or the beginning of the second 10 days. It is during this time that the blossoms of the tung oil tree open, so the masses call this the "tung blossom freeze." Before the invasion of this cold air, if the period of the return of warmth in March has been a long one and temperatures have been fairly high only to be followed by a sudden drop in temperatures in early May, the masses term this the "return of cold in spring." By this time, the early rice crop has been sown virtually everywhere in the whole province, and this "return of cold in spring" poses very great dangers for the growth of early rice seedlings.

According to statistical data for the past 30 years, spring cold brought on by cold air during the spring planting season in the province was worst in 6 years or 20 percent of the time (1953, 1955, 1965, 1970, 1972, and 1976). Fairly severe spring cold occurred in 5 years or 17 percent of the total (1956, 1960, 1961, 1966, and 1974). Togehter the two account for 37 percent of the total number of years, which is to say that spring cold occurs on an average of once every 3 years.

In order to assure full heading of the late rice crop in a two-crop system before the advent of low autumn temperatures, the early rice crop must be sown at the right time. But if the early rice crop is sown too early, its seeds or seedlings may rot once the spring cold occurs. Thus, the early rice crop should be sown neither too early nor too late. A look at climatic data over the years and the experiences of the masses shows large-area planting in southern Jiangxi should begin in mid-March. In northern Jiangxi, it should be planted bit by bit following the vernal equinox. However, this is only the general pattern for normal years, so

[2] The period when there is 80 percent certainty that average daily temperature will stabilize at 10°C is called the early rice safe-sowing period, but the period when the average value has only a 50 percent certainty rate is called the beginning of the early rice sowing period.

each jurisdiction must consult its meteorological station's forecasts and the experiences of the masses and suit general methods to specific circumstances to determine planting times. Even in normal years, cold and warm currents intermingle during spring weather and the opportune moment for planting must be seized. In general, seeds should be treated before cold weather arrives, and planted after skies are clear and warmth returns. As a result of long practice in production, the masses have figured out and summarized experiences as "treating seeds when the cold begins, forcing sprouting when the cold ends, and rushing to sow during clear days, which is an effective method. In order to reduce the rotting of seeds and seedlings as a result of spring cold, seedling-growing techniques must be improved as well, cold-resistant varieties selected for growing, and measures adopted, such as sensible draining and irrigation, so that water is used to conserve warmth in order for seedlings effectively to withstand low temperatures and overcast or rainy days and protect their sturdy growth.

2. Flooding and waterlogging. Rainfall is pretty well concentrated from April to June each year in Jiangxi Province. This frequently causes rivers to rise and flooding or waterlogging disasters to occur. Since the high-water season occurs at different times, it may be divided into "grain fills water," [around 21 May]; "grain in ear water," [around 6 June]; "dragon boat water," [the fifth day of the fifth lunar month], and "summer solstice water." In areas in the middle reaches of the five major rivers, flooding and waterlogging occurs between April and June. In areas around lakes, flooding and waterlogging occurs between May and July. The occurrence of flood and waterlogging disasters is closely related to torrential rains. There are four centers of torrential rains in Jiangxi Province as follows: One is the Wuyi Mountain and Huaiyu Mountain area. This is a wide area where torrential rains are powerful and frequent, the number of days of torrential rains averaging 6 or 7. The second is in the area of the upper reaches of the Fu River and the Mei River where the size of the area and the power of the torrential rains is somewhat less than in the previous locale. On average, this area receives 5 to 6 days of torrential rains annually. Third is in the area between Mufu Mountain and Jiuling Mountain where the size of the area, the power of torrential rains, and the frequency of their occurrence is about the same as at the second location. Fourth is near the upper reaches of the Shangyou River where the size of the area and the power of the rains is fairly small, and the number of days of torrential rains averages about 5.

The province has between 4 and 7 days of rains that are rather clearly torrential in nature between April and June, but the areas of their occurrence vary widely. Torrential rains on a provincewide scale are few. Usually torrential rains last for 1 or 2 days, however, in certain years the torrential rain belt fluctuates from south to north and the rains may last for more than 10 days. For example, between 12 and 28 June 1962, the torrential rain belt moved back and forth from north to south and rain fell for 16 days in a row. The force of the torrential

rains brought between 50 and 100 mm daily, and a few torrential rains brought between 100 and 200 mm of rainfall each day. The greatest torrential rain brought between 300 and 500 mm or more rain per day.

An area of about 7 million mu in the province is threatened with fllods and waterlogging in most years. The areas of fairly serious flooding and waterlogging are located mostly in the middle and lower reaches of the Gan, Fu, Xing, Rao, and Xiu rivers, and around the shores of Boyang Lake. The famed large dikes of the Gan and the Fu rivers were built in order to guarantee the safety of the lives and property of people living on the Ganfu plain. In addition, in hill and mountain regions where plant cover is poor and erosion fairly serious, torrential rains frequently give rise to mountain torrents that pose very great dangers.

Partial mountain torrents may also be triggered by the effects of typhoons during summer and autumn each year, however, in most years the rains brought by typhoons play a definite role in moderating or eliminating autumn drought in the province.

3. Drought. Around the end of June each year, the province enters a dry period with long stretches of sunny weather and little rain when percipitation decreases noticeably. Peasant adages say, "During the 'slight heat' [around 7 July], the south wind blows for 18 days, and during the 'great heat' [around 23 July], the south wind is so dry it rends the sky," and "during the height of summer, 10 days of shade would be hard to come by." These adages capsulize the sunny and dry weather of midsummer. "Drought affects broad areas while flooding affects a line" is another adage meaning that the effects of drought are more widespread than the effects of flooding and waterlogging. Drought is one of the major natural disasters threatening the province's agricultural production. Not only does drought frequently occur in the province during the dog days of summer, but autumn drought, winter drought, summer drought and spring drought also occur. Of all the droughts, protracted midautumn drought poses the greatest peril for production.

Midsummer and midautumn drought occur fairly frequently in the province. As a result of the domination of hot and dry air masses during July and August, precipitation amounts to only slightly more than 100 mm or even less than 100 mm, a sharp decline from the 100 to 200 mm of June. In some years, the maximum variance may be more than 500 mm. It is also during this period that temperatures are very high and the amount of evaporation very great. Evaporation may average more than 200 mm per month, much more than the amount of precipitation, and drought becomes extremely apparent. The drought period lasts for 20 to 30 days, or for 40 to 50-odd days at most. This is precisely the time when the second rice crop is transplanted and grows. Irrigation is necessary, and if moisture is insufficient, reduced yields or loss of the harvest may well result. Sometimes, however, thunderstorms occur that ameliorate the drought somewhat. During September and October, the amount of precipitation is also fairly slight at less than 100 mm, and autumn drought frequently occurs. In some years, autumn drought follows on the heals

of midsummer drought, and no soaking rains fall for more than 100 consecutive days. Rivers and ponds dry up, and creeks stop flowing. In Nancheng, for example, less than 3 mm of rain fell each day between 20 July and 7 November 1963.

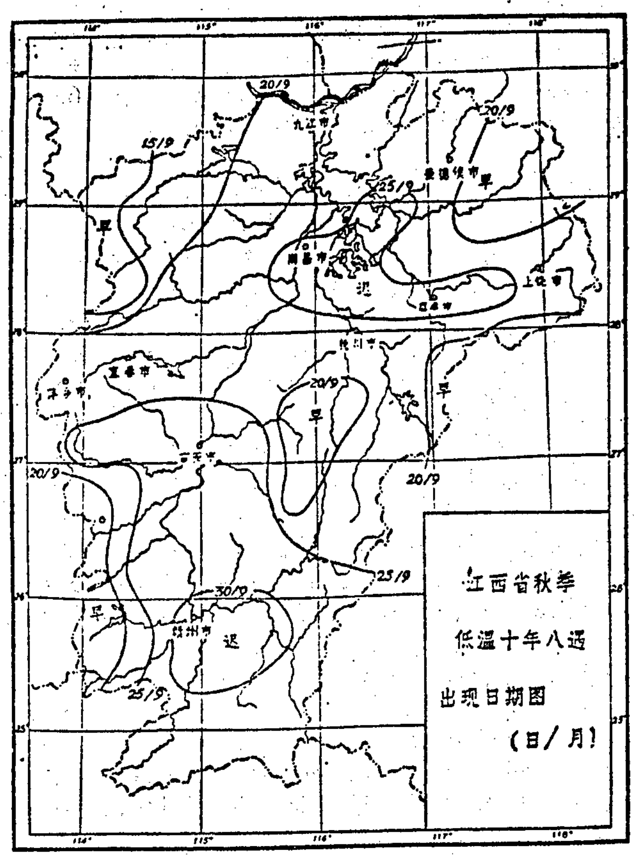
Winter is the season when the province receives the least amount of precipitation all year. Autumn drought does not occur frequently, however. Furthermore, overwintering crops do not require much water. Thus, except for individual years of a serious shortage of rainfall that causes Chinese milk vetch and rape to yellow and winter, overwintering crops are little affected.

Summer drought refers to no "plum rains" falling during June, or to a particularly early end to the rainy season giving rise to drought. Though such disasters also do not occur frequently, once they do occur, insect pests usually break out or sweltering weather occurs requiring that action be taken.

Historically droughts have been frequent and serious in Jiangxi Province. During the period of Kuomintang reactionary rule, in particular, each drought produced a scene of utter desolation with the bodies of the starved being strewn everywhere. During the 7-year period from 1929 to 1935, for example, drought disasters occurred in 1929, 1932, 1934 and 1935, with the drought of 1934 affecting an area of more tahn 27 million mu or three-fourths of the total crop area at that time. With the building of water conservancy, afforestation, conservation of water and soil, and development of irrigation following liberation, though droughts occurred during 1951, 1956, 1958, 1963, 1967, 1971 and 1978, the disaster-stricken area was greatly reduced. Incomplete statistics show that currently only about 10 million mu of farmland in the province is fairly seriously threatened by drought in most years. Further victories against drought will require genuine achievement of "having water when drought strikes." In addition to building more reservoirs and mountain pools, vigorous efforts will also have to be made in afforestation, the suiting of general methods to local circumstances for promotion of a system of crop rotation between wetland and dryland crops, institution of rational drainage and irrigation, and scientific use of water in order to improve capabilities to withstand drought.

4. Low autumn temperatures: The force of cold northern air gradually increases in autumn. If average daily temperature for 3 consecutive days or more falls to 20°C (hybrid rice grain production requires 23°C), and open field production requires 22°C), or if average daily temperature falls to 20°C for 2 days or more, while the lowest temperature is below 16°C, this is extremely bad for the heading and blossoming of late-crop rice in a two-crop system. At very least, the empty glume rate will increase; at worst, no grain crop will be harvested. Depending on the strength of cold air in individual areas of the province, and location, terrain and variations in topography, autumn low temperatures will come earlier in some parts of the province than in others. As a result, the masses refer to the arrival of cold air in different ways. In the

lakeshore region of northern Jiangxi where low autumn temperatures come fairly early, are frequently accompanied by high winds or rainfall, and occur during midautumn, (between the end of the first 10 days of September and the beginning of the last 10 days of September), they are termed "midautumn winds." In the Wuyi Mountain region, they occur mostly during the season when the cassia flowers scent the air (around mid-September), so they are called "cassia flower freezes." In southern Jiangxi, low autumn temperatures come relatively late, occurring most around the time of cold dews around 8 October, so they are termed "cold dew winds." Analysis of climatic data for the past 30 years shows the following: Years when low autumn temperatures were serious were 1957, 1965, 1969, 1972, and 1974, or 17 percent of the time. This was an average of one serious case of low autumn temperatures every 5 years causing substantial damage to agricultural production. The key to avoidance of damage from low autumn temperatures during late autumn lies in doing everything possible so that full heading of the second rice crop occurs before the advent of low autumn temperatures. This requires simultaneous consideration of the harvest time for the previous crop, plus an extrapolation of the number of days that will be required for safe full heading, arrived at on the basis of the growing period for the particular species of rice grown as the late crop in a two-crop system in order to determine the time when sowing and transplanting should be done. It also requires selection of fairly early intermediate maturing and cold0 tolerant varieties in order to avoid damage from "cold dew winds." The period of safe full heading referred to here means the period when low autumn temperatures have not affected heading in 8 out of 10 years, though early arrival of low autumn temperatures did cause damage in 2 years. In addition, in some years, cumulative temperatures for growth of the late crop are lower than in most years, causing a delay in the flowering period. Either seedlings or fully grown plants may be of poor quality, development may be slow following transplanting, causing a delay in the flowering period, or else improper selection of varieties grown and too late follow-up fertilization may weaken ability to withstand cold and the crop will sustain cold damage. Thus, in order to overcome the danger from low autumn temperatures, not only is it necessary to understand fully the operation of the seasons and make sure that full heading is complete before the advent of low autumn temperatures, it is also necessary to take effective actions against the cold should the flowering period coincide with the arrival of low autumn temperatures. Such action includes leaf feeding, irrigation to increase temperatures and use of temperature-increasing agents. As regards mountain regions where mountains are high, the water cold and sunshine slight, where low autumn temperatures arrive early and where, generally speaking, tight scheduling and much hard work is required during the farming season and neither fertilizer nor water conservancy is readily available, emphasis should not be placed on spreading the growing of two rice crops. Instead of a single crop of rice plus winter crops should be grown.



Map Showing Dates of Eight Occurrences of Low Autumn Temperatures in Jiangxi Province (day/month)

Third Section. Status of Water Resources and an Agricultural Evaluation of Them

1. Numerous Rivers and Lakes That Form a Centripetal Water System Centering Around Boyang Lake

Crisscrossing by rivers and canals and a dense water network are outstanding features of the province's hydrology. Survey statistics show more than 2,400 large and small streams throughout the province totaling 18,400 km in length. More than 160 of them totaling 13,000 km in length have water in them in most years. Except at Pingxiang in the west and some parts of Xunwu and Dingnan in the south where these streams are tributaries of the Xiang River and tributaries of the Lu and the Pearl River and the basin of the East River, and except for a small number of streams in the north around Ruichang and Pengze that empty directly into the Yangtze, all others rise in the province's eastern, western, and southern mountainlands and traverse vast hill and mountain basins converging to form the five great river system of the Gan, Fu, Xin, Rao and Xiu rivers, which finally empties into Boyang Lake to form a complete

centripetal water system centering on Boyang Lake. In addition to the five large rivers, the Gan, Fu, Xin, Rao, and Xiu, this huge water system also includes 19 tributaries with a basin area of more than 200 sq km. The basin area of the whole water system amounts to 162,200 sq km, which is 97 percent of the province's total land area.

The Gan River cuts across the province from north to south to form the main axis of the province. It rises in the mountains that fringe the province to the south. It has two main sources, one being the Gong River and the other the Zhang River. The two sources converge at Ganzhou where the river begins to be called the Gan. In the upper reaches (above Ganzhou), the river system is fan shaped, and the middle reaches course first through gorges and finally through basins and hills, with several tens of large and small streams converging into it along the way. In its lower reaches (below Xin'gan), it is a vast river and enters the broad Boyang Lake Plain and dike region. The main stream from Ganzhou to Wucheng in Yongxiu County, where the river enters Boyang Lake, is 549 km long. Together with its main source, the Gong River, which is 278 km long, it totals 827 km in length. Its basin covers an area of 80,948 sq km (the Qingfeng Mountain region not being included in this basin), which is virtually half the province's total area. It is the province's largest and also its most important river, and consequently Jiangxi Province is known as "Gan" for short. The volume of water in the Gan River is extremely plentiful. In most years, the volume of water from it entering Boyang Lake averages 66 billion m^3. Its upper and middle reaches approximately more than 3 million kW of hydropower resources. The main stream of the river is navigable yearround from Ganzhou to the mouth of the lake, and is a main artery for water transportation north and south in the province. Along its course, the river flows through the Ganzhou Basin, through Jian and Taihe basins, and on to the Boyang Lake Plain, the cream of the province's agricultural belt. Without doubt, the river is of major economic value in development of the province's agriculture.

The Fu River is the second large river in the Boyang Lake water system. Taken together with its main tributary in the upper reaches, the Xu River (163 km long), it totals 317 km in length, and has a basin area of 15,800 sq km. Its main stream goes from below Linchuan through a major agricultural area of the province, the Ganfu Plalin where the largest irrigation project in the province has been built, the Ganfu Plain project.

The Xin River is also known as the Shangrao River. The Yushan River and the Fengqi River in its upper reaches rise in the Shanxia Range and the Huaiyu Mountains on the border between Zhejiang and Jiangxi. The southern branch of its lower reaches enters Boyang Lake at Yugan. Its northern branch converges with the Rao River in Boyang County to flow into the lake. It is 313 km long and has a basin area of 17,600 sq km. Its main stream traverses the eastern part of the province, and the Zhejiang-Jiangxi Railroad travels through the valley of the Xin River.

The Rao River includes the Lean River in the south, and the Chang River in the north. The two rivers converge near the county seat of Boyang County after which the river is called the Rao River. It has a basin area totaling 14,400 sq km, and it flows mostly through the northeastern part of the province.

The Xiu River rises in the Mufu mountains on the Hunan-Hubei-Jiangxi border. Its upper reaches contain numerous rapids and a swift current, and it has a plentiful supply of water power. Below Shuixiu, it divides into numerous branches and flows into Boyang Lake. It ls 389 km long and has a 14,500 sq km basin area.[3]

Boyang Lake is the end point for the Gan, Fu, Xin, Rao, and Xiu rivers. All of Boyang Lake is the center of a centripetal water system. It formed gradually during the end of the Tertiary Era following the faulting of earth strata and gradual subsidence over a long period of time, as well as constant filling with river alluvium. The lake is shaped like a calabash that lies on the south bank of the middle reaches of the Yangtze River at the northern tip of the province. It is 110 km long from north to south, and 50 to 70 km wide from east to west. It is narrow in the north ranging from only to 5 to 15 km in width. When the alek is at its normal level (14-15 m deep),[4] it covers 3,050 sq km. When its water level is high (21 m deep), it covers an area of 3,960 sq km and is capable of holding 25.9 billion m^3 of water. When its water level is low (7-12 m deep), its area is greatly constricted to only 500 sq km. It presents a special natural scene of "an expanse of water reaching to the skies during summer and autumn and boundless barren flats during winter and spring." As a result, several million mu can be used neither to develop aquatic products nor for large-scale farming. Furthermore, total elimination of oncomelania on grassy flats poses additional difficulties.

All of Boyang Lake bounded by the Songmen Mountains between Duchang and Wucheng may be divided north and south into two lakes (or eastern and western "Boyang Lakes"). North Lake to the northwest of Songmen Mountain is also called "Western Boyang Lake." It is narrow ;and resembles the long "neck" at the top of a calabash. Actually it is a long, narrow waterway leading to the Yangtze River. Southeast of Songmen Mountain is South Lake, which is also called "Eastern Boyang Lake," which resembles the bottom half of a calabash. The lake is vast, reaching to the horizons, and is the main body of water of Boyang Lake. The northern end of Boyang Lake has a narrow outlet more than 800 m wide connected to the Yangtze River through which lake water drains into the Yangtze when the water level of the lake is normal, since the lake surface is higher than the surface of the Yangtze River. During high water, an even larger volume

[3] Data on rivers according to "Jiangxi Hydrology Handbook," (January 1973).

[4] Water height is figured using the level of the sea at Wusongkou as the base point.

of lake water flows into the Yangtze; thus, the role of Boyang Lake in regulating the Yangtze is obviously less than that of Dongting Lake. However, its silting and contraction is a long way from being as rapid as Dongting Lake. As a result, the surface area of Boyang Lake is greater than that of Dongting Hu, making it the largest freshwater lake in the country.

The main body of Boyang Lake covers a 6 million mu area, and around its fringes are Qingshan Lake, Xiang Lake, and Yao Lake in Nanchang; Junshan Lake in Jinxian; Saicheng Lake, Bali Lake, and Chi Lake in Jiujiang; Nanbei Port and Kuan Lake in Hukou; Mao Lake and Tabo Lake in Pengze; Beimiao Lake in Duchcang, Zhu Lake and Lian Lake in Boyang; and Yuchi Lake in Yugan. Such a multitude of lakes, extensive water surfaces, tangle of river branches, abundant water plants, and temperate lake waters favor the growth and reproduction of aquatic animals, such as fish. As a result, both Boyang Lake and the other lakes have become storehouses of abundant natural aquatic product resources. Taken together with the vast water surfaces provided by all the large and small streams, reservoirs and mountain pools in the province, they provide an endowment of natural conditions for development of an aquatic products breeding industry in the province.

2. Plentiful Volume of Runoff and Abundant Reserves of Hydropower Resources

Replenishment of the province's rivers and lakes comes mostly from precipitation. In most years the annual volume of rainfall in the province averages from 1,350 to 1,940 mm, while actual annual ground surface evaporation is approximately 900 to 1,000 mm or so. Clearly the amount of precipitation is greater than the amount of evaporation. Furthermore, the topography helps convergence of rainfall, with the result that surface runoff is extremely plentiful. The runoff coefficient may reach as high as 60 percent. If the annual average amount of rainfall if 1,500 mm, then runoff will average 900 mm. Total average runoff for the entire Boyang Lake water system is 148 billion m^3, or three times the Yellow River's total annual runoff (while its basin area is only slightly more than one-fourth that of the Yellow River).

Because of various factors including terrain, precipitation and plant cover, the amount of runoff varies greatly from one region to another. Distribution of average runoff in the province in most years tends to be generally between 900 to 1,200 mm for the eastern part of the province and its western mountain regions, and greatest in the watersheds of the Lean River and the Xin River in the northeastern part of the province at 1,300 mm. In the south, it is 800 to 900 mm. It is relatively little at less than 800 mm on both banks of the Gan River, in the lower reaches of the Fu, Xin, Rao, and Xiu rivers, and in the Boyang Lake Region. It is least in the middle of Ganzhou Prefecture, in Ji'an County, and around the lake where it is less than 700 mm. Looked at from the angle of balanced water and soil resources, and figuring on the basis of many years experience, the volume of water required in the province for

farmland irrigation totals about 38 billion m^3 in a drought year. This is about one-fourth the total average annual runoff for the province as a whole. This figure is based on the use of 1,000 m^3 of water per mu for the irrigation of two crops of rice, with drylands amounting to one-fourth the amount of wetlands for a total of 38 million mu of cultivated land in the whole province. If all of the currently more than 10 million mu of wasteland in the province capable of being reclaimed as cultivated land is figured in, the amount of cultivated land in the whole province would increase to more than 50 million mu. If 80 of percent of this total were regarded as wetlands, the amount of water required would be no more than 45 billion m^3, which is one-third the total runoff in the province. Therefore, in an overall sense, there is sufficient water for both industry and agriculture. However, the problem is very uneven distribution of rainfall during each year. Only one-fifth of total annual precipitation falls between July and September, but this is precisely the time when farmlands require a large amount of irrigation. In drought years, in particular, the outstanding conflict that this imbalance engenders is obvious. Practice has shown that this province must increase its water storage projects greatly in order to regulate runoff so as to satisfy requirements for agricultural irrigation and the need for water of all sectors of the national economy.

The abundance of water, plus topographic conditions dominated by hills and mountains in the province, have produced numerous natural streams. The upper reaches of the five rivers, in particular, hold plentiful resources for the production of hydroelectric power. Incomplete statistics show theoretical hydropower energy reserves to be 6.82 million kW, of which 5.3 million kW can be developed for use. Greatest reserves are in the Gan River, which accounts for 55.6 percent of the total. Concentrated in the main streams and tributaries of the upper reaches are favorable conditions for step development of numerous projects. This includes three sites at Xiashan, Wan'an and Xiajiang where fine dams with a fairly large storage capacity could be located that would also control a wide basin area. Once built, they would become the main hydroelectric projects on the main stream of the Gan River. Right now the first stage of building of the Wan'an electric power station is underway. Once construction has been completed, not only will it be able to provide large amounts of electric power, but it will also markedly improve flood prevention, irrigation, navigation, and power-supply conditions along the banks of the main stream of the Gan River, and it will also lay a definite foundation for development of hydrpower in the middle and lower reaches of the river. Other rivers also have definite utility for development. This includes reserves of hydropower in the Fu River, which amount to about 10 percent of the province's total hydropower resources. The Xiu River contains about 10.1 percent. The Zhelin Reservoir that has been built on the main channel of the Xiu River has an installed capacity of 180,000 kW and is currently the province's largest hydroelectric power station. Though the Xin River contains about 9.2 percent of reserves, the gradient of the main channel is fairly gentle and the river valley broad. It lacks conditions for the building of a control reservoir. The Chang River in the water system of the Rao River contains 4 percent of the province's hydropower resources.

The province's hydropower resources are not being used to the full at present. As of the end of 1979, hydroelectric stations already in production had an installed capacity of close to 10 percent of total reserves of hydropower and a fairly great potential exists for further development.

3. Marked Seasonal Changes in Volume of Flow and Water Level

The great amount of rainfall in the province during spring andsummer, and the midautumn drought occasion yet another remarkable feature of the province's hydrology, namely, marked seasonality in the volume of flow and water levels. The period from April to September is the high-water period for all the province's rivers, the Yangtze River and Boyang Lake. The period from October to February the following year is the dry season. The amount of runoff in the course of each year is concentrated largely between April and June. Volume of runoff during these 3 months usually amounts to about 60 percent of total runoff for the year. Whenever precipitation is concentrated toward the end of spring and the beginning of summer, water levels rise dramatically, frequently giving rise to danger from flooding and waterlogging. The most serious threat is to the large tracts of farmland along the banks of the middle and lower reaches of all rivers and in the area around Boyang Lake. But during midsummer and early autumn, from July to September, precipitation declines markedly. The weather becomes intensely hot; the air becomes dry, and the amount of evaporation is especially great. This gives rise to pronounced drought, and the period between October and February of the following year is one of markedly low water for the province's rivers and lakes. During December, the amount of runoff is only 2 to 3 percent of the total runoff for the year. This is between five and seven times less than maximum runoff during June. Water levels during the low water season are 7 to 9 m lower than during the flood season, and maximum variation between highest and lowest water levels in most streams during the year may be more than 10 m. The difference in Boyang Lake may reach 13 to 15 m. The difference in Boyang Lake may reach 13 to 15 m. The difference in runoff between maximum and minimum years may reach several hundred percent. For example, measurements of maximum volume of flow taken at the Gan County measuring station in the upper reaches of the Gan River showed maximum flow to be 9,230 m^3 per second and minimum flow to be 34.8 m^3 per second, a more than 265 percent difference. In some places, the difference is several thousand percent. There is less difference in the lower reaches than in the upper reaches. For example, records from the Waizhou Hydrology Measuring Station in Nanchang show a maximum volume of flow of 20,900 m^3 per second and a minimum flow of 172 m^3 per second, a 120-fold difference.

Marked seasonal variations in volume of flow and water levels have a very great effect on agricultural production. Though the plentiful volume of flow and the increase in water levels during flood season is definitely advantageous for the paddy rice production carried on over a wide area of the province in that it makes available irrigation water, nevertheless, the rapid rise in the midele and lower reaches of all rivers frequently

poses flooding and waterlogging dangers. The lower reaches of the five rivers, and the Boyang Like region, in particular, are serious flooding and waterlogging areas of the province. In most years, about 4 million mu of cultivated land in the province is at risk from flooding and waterlogging, and in years of major flooding, the amount may reach 6 to 7 million mu. The task of fighting floods and draining waterlogging is an extremely arduous one. In hill and mountain regions where plant cover and ground mulch is poor, torrential rains frequently cause mountain torrents that cause very great damage. The areas south of a line running from Taihe to Nanfeng, and north of a line running from Shangyou through Ganzhou, Yudu, and Ruijin are areas of fairly serious mountain torrents. In these areas, particularly in the low mountain and hill region of the Gan River basin where large areas of granite rock outcroppings have been flaked off as a result of deep weathering and where a red rock series is widely distributed, torrential rains cause mountain torrents which frequently produce extensive erosion. Take the Ping River, a tributary of the Gong River in the upper reaches of the Gan River, for example, where the suspension load erosion modulus may reach 442 tons per sq km. Survey statistics show that as of the end of 1978, a 38.89 million mu area of the province was being eroded, 21 percent of it seriously and southern Jiangxi most seriously with an erosion area amounting to one-third the total erosion area of the province.

With the advent of the low-water period during the midautumn drought, the volume of river flow decreases sharply. However, this is precisely the time when farm crops such as late paddy require a relatively large amount of water. This gives rise to a conflict between the amount of water available and crop needs for water. Some hill regions lacking water but that are otherwise suitable for the growing of autumn-harvested crops, such as late rice and cotton in a two-crop system, are endangered by drought. In short, flooding and waterlogging, drought, and erosion are extremely disadvantageous for development of the province's agricultural production. It is necessary to proceed from realities in individual areas, take a firm grip on main contradictions and suit general methods to local situations in the repair of large dikes, the building of reservoirs and dams, and increasing facilities to provide irrigation and fight drought so as to apportion equitable the use of water throughout the whole year, make full use of water resources, and insure consistently high farmland yields.

4. Ground Water Resources Fairly Plentiful

Jiangxi Province has plentiful surface runoff, and it also have a substantial amount of ground water reserves. Though the latter amounts to only 6 percent of the former, total reserves as calculated from minimum annual runoff amount to approximately 9 billion m^3. Total usable reserves amount to about 4.5 billion m^3. The 9 billion m^3 is close to one-fifth the total volume of flow of the Yellow River and averages a flow of 1 million m^3 per hour. The ground water flow modulus is 6.2 m^3 per hour per sq km. These reserves are greater than those of neighboring Hunan Province, and are a fairly plentiful natural wealth.

In terms of regional distribution, the province's ground water resources are generally more plentiful in the north than in the south, and more plentiful in the west than in the east. The phreatic water basin in Quarternary Era alluvial strata on the Boyang Lake plain in the north contains the most plentiful ground water reserves in the province. The water table is not very far below the surface of the ground, and it contains a large volume of water, which favors development for various goals. It also offers favorable conditions for providing irrigation water to fight drought during summer and autumn drought on the Boyang Lake plain. Next, the Jin River and Yuan River basins in western Jiangxi, the Xiu River basin in western Jiangxi, and some places in the southern Wugong Mountains of central Jiangxi have good-quality ground water in large amounts suitable for extraction. Shanggao County has already begun to block underground streams and divert their flow to irrigate farmland, and this provides experience for the use of ground water in areas where limestone occurs.

Among the province's ground water resources are numerous hot springs. Between 60 and 70 sites have been discovered at which hot water emerges from the ground or warm springs occur. Use of these hot springs provides excellent natural conditions for the building of all sorts of over-wintering areas for warm-water-loving aquatic organisms as well as for development of hothouses over large areas for the propagation of seedlings.

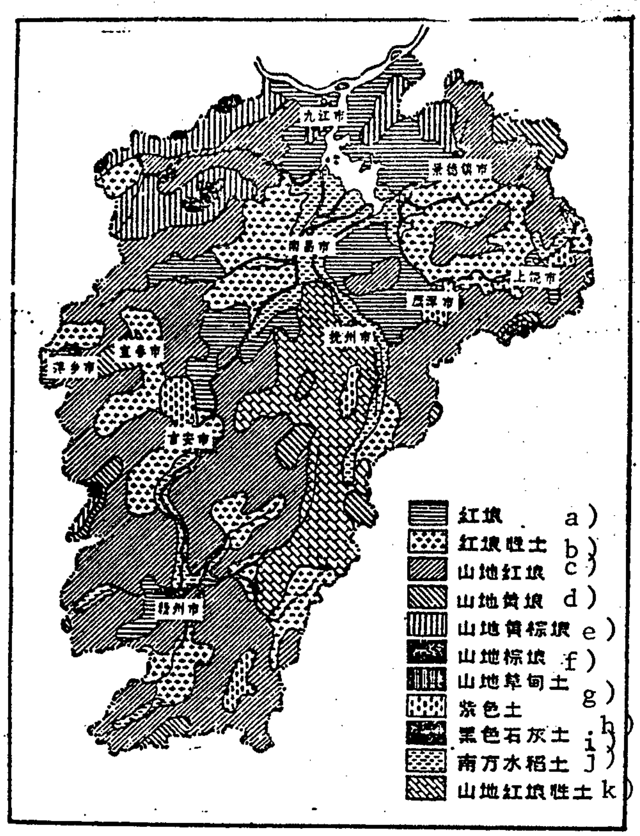
Fourth Section. Basic Soil and Plant Cover Characteristics and an Agricultural Evaluation of Them

Major Soil Types, Properties, and Their Distribution

The province's soils that occur in zones are mostly red earth and yellow earth. They have been formed under climatic conditions of warm temperatures and much rainfall, and because rocks and minerals have been fairly thoroughly broken down, the soil particles have been made smaller and smaller, large amounts of salts and silicic acid have been leached out, and relatively large amounts of iron oxide and aluminum oxide have accumulated in them. For these reasons, with the exception of the effects of certain mother rocks, the soils of Jiangxi Province are characteristically clayey and acidic, the most representative examples of which are red earth and yellow earth. Red earth is found over a very wide area all the way from low hill areas around the lake at an elevation of more than 20 m above sea level to high hill and low mountain areas at an elevation above sea level of 500 to 600 m. They account for 46 percent of the province's land area, making Jiangxi one of the areas in South China with a fairly large areas in which red earth is found. The province's red earth may be divided on the basis of soil properties into subcategories of red earth, red earth type soil, and yellowish red earth, with the red earth subcategory being the largest in area. It is found widely in hill regions, but is most concentrated in low hill regions. Since plant cover has been destroyed pretty much everywhere, the soil's natural fertility is very low. However, slopes are gentle and the soil layer thick, making soil improvement possible. These are regions for the

development of cash crop fruit trees, farming and animal husbandry. Red earth is found mostly in mountain regions below 500 m above sea level, and is termed mountainland red earth. In these areas, natural plant cover and forests grown by man are fairly lush, so the soil's organic content is relatively high, making it suitable for development of economic forests and animal husbandry. Yellowish red earth is found in low mountain regions throughout the province at between 500 to 800 m above sea level. In terms of vertical distribution, it is a transitional type between mountainland yellow earth and mountainland yellowish brown earth. Since plant cover is lush and the climate moist, the surface layer of the soil has yellowed; it contains relatively large accumulations of organic matter and its natural fertility is fairly high, making fine bases for development of forestry.

Soil Distribution in Jiangxi Province



Key:
- a) Red earth
- b) Red earth type soil
- c) Mountainland red earth
- d) Mountainland yellow earth
- e) Mountainland yellowish-brown earth
- f) Mountainland brown earth
- g) Mountainland meadow soil
- h) Purple soil
- i) Black lime soil
- j) Southern paddy soil
- k) Mountainland red earth type soil

Red earth may develop out of various kinds of mother materials, and different kinds of mother material have a rather great affect on the properties of red earth. In Jiangxi Province, the red earth area formed out of Quarternary Era red clay is largest, being found widely on both banks of the middle and lower reaches of the Gan and Fu rivers, on the Boyang Lake plain, and in the Taihe Basin on hills below 50 m above sea level. The soil layer is fairly thick and shows a bright red color. It is a heavy clay in nature, and at lower levels there is frequently a

striated layer. It is either acidic or strongly acidic. Red earth formed out of red sandstone contains a fairly large amount of fine sand throughout and is relatively light. The soil layer is relatively thin, and the soil's phosphate content is particularly low. It is relatively concentrated in the hills of eastern Jiangxi and in low hills below 5o to 100 m above sea level in the valley of the Xin River. Red earth formed from weathered granite is found mostly in southern Jiangxi, and since soil layers are intercalated with a fair amount of quartz sand particles, the soil is fairly loose and prone to scouring. It has a high potash content, however, which make it good for the growing of farm crops. Red soil that has developed out of metamorphic rocks such as phyllite, gneiss and slate is usually brownish-red in color and is like fine clay in texture and intercalated with a fair amount of rock debris. Its natural fertility is relatively high, and it is found scattered here and there in some high hill and mountain regions.

Yellow earth is found mostly in mountain regions at between 800 and 1,200 m above sea level and is frequently intermixed with yellowish-red earth and brownish-red earth. The process of yellow earth formation is the same as for red earth; it is simply that the free iron oxide in the body of the soil has been hydrolized and a yellow color has emerged. Where plant cover has been fairly lush, it contains substantial organic material, the content reaching more than 4 percent. Thickness of the soil layer varies, and the soil is suitable for development of forestry or the raising of sheep and goats.

The most important mountainland soils in the province aside from mountainland yellow earth are mountainland yellowish-brown earth and mountainland meadow soil. Mountainland yellowish-brown earth is found mostly at between 1,000 and 1,400 m above sea level and above. The soil layer is brown in color and its organic content reaches as much as approximately 8 percent. It exhibits an acidic or mildly acidic reaction; its natural fertility is high and, like mountainland yellow earth, it is suitable for development of forestry and the growing of medicinal herbs. The mountainland brown earth and mountainland meadow soil areas are very small, and are found most commonly at 1,400 to 1,700 m above sea level and above. These places are cold and damp all year round, and the organic content of the soil reaches more than 10 percent. The soil is potentially very fertile, and is suitable for the growing of medicinal herbs.

In addition to the foregoing, natural soils of the province include some nonzonal soils formed in consequence of geological, topographic and hydrological conditions, principal of which are the following:

Purple soil: This soil is found mostly in southern and northeastern Jiangxi and in the hills on both banks of the middle reaches of the Fu River. Its mother material was either purple sand shale or purple sandstone. The soil layer appears purple. It is a soil formed from rock that is rich in phosphate and potash, that is either neutral or slightly alkaline, that has fairly high natural fertility, and that is an important dryland crop soil. However, in some places where the plant cover has been seriously damaged, it has been seriously eroded.

Alluvial meadow soil. This is the main naturally occurring soil found around the lake and in river valley plains. It is also called either grassy sandbar soil or wet sandy mud. The soil layer is fairly thick, and it is nearly neutral in pH as a result of the role of double salt radicals. It contains fairly high amounts of organic matter, nitrate, and phosphate. It has naturally high fertility, and all that is needed is improved water conservancy conditions for this kind of soil to mature into very fine cropland soil.

Limestone soil. This kind of soil has developed from weathered limestone. It is found in numerous counties in northern, western, and southern Jiangxi, but it does not occur over a wide area. Soil properties are rather greatly influenced by the mother material fromwhich it was formed. It usually shows a weakly alkaline or alkaline pH; the soil layer is shallow; it is heavy and claylike, and it is moderately fertile. If used sensibly, its productivity is fairly high.

All naturally occurring soils become one kind or another of cropland soils as a result of cultivation and maturation. The province has numerous kinds of cropland soils, but most important is paddy soil. Paddy soil is formed from the wet cultivation and maturation of various kinds of natural soils, and occurs over a very large area. There are more than 30 million mu of it in the province, or virtually 80 percent of the province's cultivated land. On the basis of variations in natural soils and human farming activity, most of it may be divided into four subtypes as follows:

Red earth type paddy soil (yellow mud fields). This is formed from the wet cultivation and maturation of yellow earth. This subtype covers more than 60 percent of the paddyfield area of the whole province, and is found mostly on terraced fields in low mountain and hill regions. The soil layer is relatively deep, the ground water table is fairly low, and the soil's pH is acidic. It has about 2 percent organic content and lacks phosphate. It is a leathery soil with a firm plow pan. Large areas of low yield fields made up of this soil are a focus of the province's soil improvement efforts. Nevertheless, black muddy fields consisting of highly mature red earth type paddy soil may have an organic content of 2.5 percent or more, and they are fertile, high-yield fields.

Alluvial type paddy fields (wet sandy mud fields). Such fields are made up of wet-farmed and mature grassy sandbar soil and alluvial mother material. Such fields are found on the shores of Boyang Lake and on alluvial plains on the banks of all large rivers. Their area of occurrence is second only that of red earth type paddy soil. This type soil has a deep soil layer that is moderately sandy mud, that percolates well, that is fertile, and that contains about 2 to 3 percent organic material. It is one of the paddy soils that is fairly fertile.

Purple soil type paddy soil (purple mud fields). This is formed from wet-cultivated mature purple soil. It is fairly widespread in southern Jiangxi. Usually this type soil is fairly fertile and contains abundant phosphate and potash. If used properly, most of it makes a high-yield fields.

Lower Sichuan series yellowish-brown earth type paddy soil (magan soil fields). This is formed from yellowish-brown earth and is found largely in the hills of some northern Jiangxi counties. The soil is dark brown in color, heavy and claylike in nature, looks like a horse's liver hence the name magan, is hard to cultivate, and is usually fairly infertile.

Gleyed type paddy soil (blue mud soil) is found mostly in mountain region shallow valley fields, alluvial fields, and in some flat fields in low-lying areas. The soil layer is deep and has a greenish-gray to bluish-gray gley layer. This soil is heavy and clayey; the ground water table is high; soil temperature is low; micro-organism activity is weak; organic content is high; effective nutrients are low, and latent fertility is fairly high.

2. Improvement and Use of Red Soil

The province's warm climate, copious rainfall, and thick soil layer provide an excellent environment for rapid crop growth and development, and these are advantageous conditions for the development of red soil for use. However, inasmuch as red soil also has the shortcomings of being "infertile," "acidic," "clayey," and "leathery," plus the influence of socioeconomic conditions, agricultural production has developed unevenly. In some places, for various reasons such as water conservancy not being all it could be, or improper improvement measures, or even irrational cultivation and use, almost 6 million mu of red earth type low-yield fields exist in the province plsu more than one-half of the red earth type low-yield drylands in the province, which have long produced low and inconsistent yields. This has been one of the major reasons impairing balanced development of the province's agricultural production, and it is where a huge potential for increased yields lies.

The province's red earth type low-yield fields may be roughly divided into two main types, namely, yellow mud leathery fields and leathery sandy fields. Yellow mud leather fields include dead yellow mud fields, red mud fields, and fire clay [3499 8247] fields that have developed out of red clayey soil and red earth. The soil is mostly leathery heavy clay with a shallow cultivable layer, poor structure, poor porosity, low fertility, an organic content of about 1.5 percent, and a very great lack of both nitrate and phosphate. Leathery sandy fields include hard sediment [3088 2647] fields, pasty [7240 3364] fields, and red sandy mud fields. They have been formed mostly from red sandstone and red earth. When the soil in such fields is dry, it is friable, but as soon as it becomes wet, it rapidly precipitates and becomes leathery. Though it can be plowed and harrowed easily, it is extraordinarily difficult to transplant seedlings into it or weed it. Usually the cultivated

layer is thin and lacking nutrients, and its ability to hold water and fertilizer and supply fertilizer is poor. Red earth type low-yield drylands consist mostly of yellow mud soil, red sandy soil, and gravely soil, all of which are characterized by low nutrients, and a poor structure.

Thanks to the serious attention given by party and government authorities since the founding of the People's Republic, and the concerted efforts of numerous production departments and research units in the province, research has been launched on how to improve red earth so it may be used in multiple ways for farming, forestry, animal husbandry and sideline occupations, emphasis being placed on using red earth soil resources in multiple ways, and a start made in finding suitable crops and forest trees to plant in it. Research has gradually probed the nature of red soil, ways to improve it, and how it matures. These efforts have provided fairly complete technical measures for bringing red soil under cultivation, for improving it, and for planting it in a combination of farming, forestry, and animal husbandry. During the mid-1950's a start was made at reclaiming more than 3 million mu for use, a little at a time. More than 100 farms for reclamation for multiple uses were established. In addition, more than 6 million mu of red earth low yield fields in the province increased yields by from 11 to 63 percent os that average yields increased two or threefold over the former 200-odd jin per mu. This included 12 million mu of red earth low-yield fields that exceeded targets set by "The National Program for Agricultural Development" to become consistently high-yield fields. A summarization of the foregoing technical experiences in improving red earth has the following several main points:

1. Suiting of general methods to specific circumstances in comprehensive planning of the use of land for farming, forestry, and animal husbandry. Valleys with gentle slopes at a gradient below 8 degrees should be used primarily for farming. Slopes with an 8 to 20 degree gradient should be used for the growing of economic forests of tea, mulberry, tea oil and fruit trees, which help conserve soil and water. Mountainlands and hills with a gradient of more than 20 degrees on which the soil layer is thin and prone to erosion should be used for the development of forestry and the impounding of water to conserve the soil. Places with slopes of different gradients should energetically develop animal husbandry production to widen sources of manure in order to improve low-yield red earth type fields.

2. Comprehensive tackling of mountains, water, fields, forests and roads. Since most of the red earth type low-yield fields are located in the province's rolling hills and downlands where plant cover is scant, water storage conditions poor and erosion serious, afforestation of barren mountains to conserve water and soil, leveling of fields, building of terraced fields, expansion of sources of water and diversion of water for irrigation are effective measures for tackling red earth type low-yield fields in a comprehensive way. Before liberation, the Jiaoqi Production Brigade in Yongfeng Commune, Xingguo County was a poor, barren mountain gulch with serious erosion problems. After liberation, efforts were

focused on erosion as the real root cause of low yields, control of the mountain being taken as the basic task, control of water the key element and control of fields as the foundation. A combination of both biological and engineering measures were adopted to tackle mountains, water, forests and roads in a comprehensive way. During the past 20-odd years, more than 600 mu of red earth type low-yield fields have been transfomred, and since 1966 grain yields have increased steadily. Jinxian County located on the shores of Boyang Lake is a classic hill region red earth area in which 90 percent of the cultivated land is red earth wetlands or drylands. For more than 20 years following liberation, this county steadily tackled development of mountains, water, fields, forests, and roads in a comprehensive way and by 1964 it had substantially brought under control the scouring away of soil and was able to guarantee a harvest from 60 percent of the land despite drought or waterlogging. Soil fertility was greatly increased in 80 percent of wetlands and most of the drylands, and farming, forestry, animal husbandry, sideline occupations and the fishing industry saw all-round development making the country a role model for development of agricultural production for the whole province as well as for the whole country.

3. Growing of green manure, practice of intercropping of farm crops and green manure, and intercropping of farm crops and forests to hasten soil maturation. The key to red earth improvement lies in increasing its organic content, and large-scale growing of green manure is an effective way of doing this. In the growing of green manure, it is likewise necessary to suit general methods to specific circumstances. In order to improve red earth type low-yield fields and newly reclaimed land, it is generally best to grow a winter crop of green manure, first planting radishes because they have fairly good tolerance for infertility and drought, and enrich the soil. Once soil conditions have been improved, pulses such as Chinese milk vetch may be grown as green manure. If a mixture of different green manures with pulses predominating are sown, results are even better.

Intercropping with pulses as green manure is an effective way in which to nurture the soil while using it, to hasten soil maturation and to improve soil fertility in low-yield red earth type fields. Comparative experiments with the growing of green manure in low-yield red earth type fields have produced the following percentage increases for various crops: Paddy rice, 12-26 percent; late rice in a two-crop system, 10 percent; sweet potatoes 88 percent, and wheat, 24 percent. Dongxiang County did large-scale planting of green manure on 250,000 mu of low-yield red earth fields and has brought about a fundamental maturation of the soil to set the stage for harvesting high yields. The Liujia Station Reclamation Farm located in Yujiang County tried intercropping of tea and green manure to improve the red earth. This was also successful. After having intercropped green manure between rows of tea plants for 3 years, the organic content of the soil increased from the original 0.64 percent to 1.21 percent. After planting green manure for 4 consecutive years, the soil's physical and chemical properties improved markedly. After intercropping for 8 years, organic content increased to 2.1 percent.

4. Suiting planting to local circumstances, rational crop rotation, and a combination of land use and land nurture. Many years of practice have shown that the growing on newly reclaimed red earth of peanuts, sweet potatoes, mung beans or rape, all of which are fairly tolerant of infertility, acidity and drought, is good. These crops help nurture the land and mostly increase fertility and improve the soil. Soybeans, wheat, gaoliang or sesame should be grown on red earth that has just begun to mature, and these crops should be rotated with green manure to nurture the soil. The ratio for matching crops that use the soil and nurture the soil should be 1.5:1. For red earth that has been substantially matured, the ratio for matching crops that use the soil and nurture the soil should be 2:1. For the transformation to wetlands of low-yield red earth type fields or drylands in places having limited water, wetland and dryland crops should follow each other in succession. Not only will this save water, but it will also help improve the soil and regulate the soil's nutrients. This is an effective way in which to use the soil, nurture the soil and improve red earth.

Where conditions permit, the province is currently promoting experiences in "leveling of the land, raising water up mountains, and changing drylands to wetlands," as well as "clearing wasteland and making fields for the growing of paddy rice all in the same year," efforts that have been very successful.

5. Applications of lime and phosphate, using phosphate to increase nitrate. Proper applications of lime and phosphate fertilizer to low-yield red earth fields can neutralize soil acidity, and the planting of pulses both for green manure and for farm crops converts the phosphate into an organic state and increases the proliferation of nitrogen-fixing bacteria. Thus, use of phosphate increases nitrate, and nitrate and phosphate are in balance for very remarkable increases in yields.

The province's low-yield fields, other than those of the red earth type, include cold waterlogged fields, sandy fields and fields containing toxic minerals, as well as unirrigated fields in mountain regions, fields that accumulate water in the lake region, and various kinds of "sanpao" [0005 6410] fields found in various places. Means of improving them will be explained in individual zones that follow.

3. Major Plant Cover Types and Botanical Resources

Jiangxi Province is located in China's central subtropical and wet region which has outstanding habitats, diverse kinds of plant covers, numerous species and fairly plentiful botanical resources that provide extraordinarily advantagous plant cover conditions and plant resources for development of farming, forestry, animal husbandry, sideline occupations and the fishing industry. As a result of the effects of biological and climatic conditions, most of the province's regional plant cover consists of evergreen deciduous forests whose floristic composition is evergreen species that are members of the beech family (Fagacea) as community-forming

species. Second are members of the camphor family, the camellia family, the Hamamelideceae, members of the Elaeocarpus sylvestris family, members of the Chinese ilex family and such species. The community structure is complex and plant species are numerous. Since Jiangxi Province straddles several degrees of latitude, variations in the composition of plant species exist from south to north. The south has a substantial number of tropical plant groups (such as members from India and Malaysia), while the north has a mix of numerous temperate zone plant systems (such as broadleaf deciduous trees), and gradually makes a transition toward mixed forests of broadleaf evergreens and broadleaf deciduous trees. As a result of the effects of elevation above sea level in mountain regions, plant cover shows obvious vertical changes. In the south, broadleaf evergreens are found up to 1,500 m above sea level; in the north, they are found below 300-800 m. Above this level, as altitude increases the more mixed broadleaf evergreen and deciduous broadleaf forests sppear. Mountainlands have a mixture of needle and broadleaf trees, Taiwan pine forests, and summer-green forests as well as mountain meadows. In some mountain basins, marshes may also be found.

Chapter 2. Overview of Agriculture in Jiangxi

2. Major Accomplishments in Development of Agriculture Since Founding of the People's Republic

A. Very Great Improvement in Agricultural Production Conditions

On the eve of liberation, the effectively irrigated farmland area in the whole province amounted to less than one-third the cultivated land area. A harvest could be substantially assured despite drought or waterlogging on only about one-fifth the cultivated land. Following liberation, the party and government led all the people in the province in a major effort at farmland capital construction centering around the control of water and improvement of the soil. They carried out a harnessing of mountains, water, fields, forests and roads in a comprehensive way, winning very great accomplishments. Throughout the province a total of more than 430,000 water conservancy projects were built, including the construction and substantial completion of more than 9,600 small type II or better water conservancy projects. More than 310,000 projects for the impounding of water with a 22.3 billion m^3 designed gross water storage capacity were built. Projects for the diversion of water numbered 96,000 for the diversion of a flow totaling 5 billion cubic meters. More than 16,000 projects were built for the lifting of water. These had mechanical and electrical drainage and irrigation equipment totaling more than 300 horsepower per 10,000 mu of cultivated land. An area totaling more than 15.3 million mu has been brought under various degrees of control, and the effectively irrigated area has reached 24,754,000 mu, a 1.1-fold increase over 1949 and amounting to 65.1 percent of the present cultivated land area. This includes a farmland area of 17,807,000 mu, or 46.8 percent of the present cultivated land area, from which a crop can be assured despite drought or waterlogging. Of the farmland area from which a crop can be assured despite drought or waterlogging, the area consistently reaching high-yield standards has increased to 10.99 million mu, which is 28.9 percent of the total cultivated land area. This averages out to 0.4 mu (1979 figure) per capita of the agricultural population in the province. This strengthening of capabilities to withstand natural calamities in order to carry on agricultural production in the province provides advantageous conditions for the realization of consistently high yields.

Jiangxi is one of the eight provinces and regions in the country that has plentiful water power resources. More than 5,800 large, medium and small hydropower stations have been built throughout the province with an installed capacity of 658,000 kW, or 44 percent of the province's total installed electric power capacity. This includes more than 5,580 small rural hydroelectric stations that have been built and gone into production with a 306,700 kW installed capacity. Today, 98 percent of the province's people's communes, 63 percent of its production brigades, and 46 percent of its production teams use electricity to varying degrees, giving powerful impetus to development of agricultural production. Rural

electricity use has increased from 816,000 kWh in 1957 to 394 million kWh in 1979, and the average amount of electricity used per mu of cultivated land has risen from 0.02 kWh in 1957 to 10.3 kWh in 1979, a 514-fold increase.

"Fertilizer is plant food." Though the amount of chemical fertilizer applied has increased from the average 0.2 shijin per mu of 1952 for the province as a whole to the 79.5 shijin of 1979, an almost 400-fold increase in 20-odd years, nevertheless, as compared with other southern provinces, municipalities (or prefectures), Jiangxi is one of the provinces with a relative low level of fertilization, and further acceleration of development must be done. (See Table 2-1)

Agricultural production in Jiangxi province, as in other provinces and regions throughout the country, up until the time of liberation, relied on human and animal power, and farming was primitive and backward. In the 1950's the province began to build from scratch a tractor-manufacturing industry, which developed from an annual output of 4 tractors per year in 1958 to 6,536 in 1979. Building of hand tractors also rose from 52 in 1967 to 12,005 in 1979. As of the end of 1979, the power of farm machines in the province totaled 4,162,000 million horsepower including 18,900 large and medium tractors with a total of 537,000 horsepower, 48,000 hand tractors with a total of 567,000 horsepower, and 108,000 drainage and irrigation machines with a total of 1.88 million horsepower. In addition, there were more than 4,400 trucks. In 1979, the actual machine-cultivated land area in the province reached 10.08 million mu, or 26.5 percent of the total cultivated area. A definite basis already exists for mechanized farming in the province.

B. Widespread Development of Mass Scientific Experimentation Campaign

An agricultural scientific experimentation campaign has developed widely in the province's rural villages simultaneous with major large-scale farmland capital construction, efforts to develop farm machines, an energetic increase in the amounts of fertilizer applied and use of electricity in agriculture. Today, not only have the province, prefectures and counties set up specialized agricultural research organizations everywhere with almost 10,000 scientific researchers, but 97 percent of the province's commune have established agricultural science stations (or offices); 57 percent of production brigades have established agricultural science teams; and 59 percent of production teams have established scientific e xperimentation units. Some counties have also suited general methods to specific circumstances to set up scientific research organizations depending on different types of agricultural production (Yichun County, for example, has set up a tea oil forest research institute, and Fengxin County has set up a mountain region scientific research institute). A combination of mass scientific experimentation and specialized scientific research has spurred improvements in the province's farming system and farming methods, and has hastened development of agricultural science and technology [S&T]. Back in the early 1950's, the whole province energetically promoted the "three changes" (change from a single crop to

double crops, change from intercropping to rotational cropping, and change from drylands to wetlands). This was a major reform in the province's farming system that gave impetus to large-scale development of agricultural production, cause the multiple cropping index to rise steadily, greatly increased the area planted to early and late rice in a two-crop system, and greatly increased grain production. After 1958, Comrade Mao Zedong's "Eight-Character Charter" for Agriculture was systematically applied across the board in a proceeding of realities and the suiting of general methods to specific circumstances. Proceeding from accumulated experiences in increasing production distilled from long practice in production of the peasant masses, specific requirements for the "five on-times," and "five sensibles"[1] were proposed and widely promoted for adoption in agricultural production for further impetus to development of agricultural production. After the advent of the 1970's, with the all-round development of agricultural S&T, the province's level of scientific farming also rose increasingly. It went from the use of plastic mulch for growing seedlings to the promotion of the hydroponic growing of seedlings in hothouses; from the sparse planting of large plants to a combination of rational plant density and narrow rows of plants with rows in between; from flood irrigation to a combination of sunning the fields and "moist ditch irrigation methods"; from deep application of fertilizer to a deep application in combination with leaf feeding; from use of only nitrate fertilizer to applications of a mixture of nitrate, phosphate and potash; from the use of humic fertilizer and bacterial fertilizer, to the use of trace elements. These practices symbolized the development of agricultural S&T everywhere in the province, and steady rise in the level of scientific farming, and numerous advanced role models in scientific farming appeared in places like the Xiangshuotian Production Brigade in Xiangping. In the breeding and promotion of superior varieties, the province went through the breeding and promotion of "Liantangzao" and "Nantehao," during the 1950's, and the breeding and promotion of "6044" and "7055" short-step superior varieties in the 1960's. During the 1970's a breakthrough was made in the matching of male-sterile three lines. In the process of using hybrid heteroses to promote hybrid paddy rice, the whole province leaped forward in grain production, and broad vistas were opened up for tremendous future increase in grain output and the level of agricultural production.

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1 The "Five on-times" are "on-time turning of the fields, on-time sowing, on-time transplanting of seedlings, on-time weeding, and on-time harvesting." The "five sensibles" are "sensibly deep plowing, sensible matching of varieties and rotational cropping, sensibly close planting, sensible fertilization, and sensible irrigation."

表 2—1　　江西省农业现代化水平与南方十三省(市)比较

(1978)

a) 省(市)别 ＼ b) 项目	c) 化肥施用量(万吨)	d) 平均每亩耕地施肥水平(斤)	e) 农业用电量(亿度)	f) 平均每亩耕地用电水平(度)	g) 平均每万亩耕地拥有农机动力(马力)	h) 机耕面积占耕地面积的 %	i) 旱涝保收高产稳产农田面积(万亩)	j) 占总耕地面积的 %
k) 全国	4368.1	58.6	253.1	17.0	1071.6	40.9	33695.3	22.6
l) 南方十三省(市)合计	2452.1	82.85	110.9	18.7	/	29.2	17576.1	29.6
m) 江西	115.1	60.6	3.6	9.5	937.1	24.0	1008.2	26.5
n) 江苏	372.7	106.6	23.2	33.2	1660.2	55.6	2970.0	42.5
o) 浙江	181.5	131.7	12.9	46.8	1939.1	45.3	866.5	31.4
p) 安徽	151.3	45.1	9.4	14.0	1099.1	31.3	1284.5	19.2
q) 福建	112.0	115.1	4.9	25.2	1172.7	29.1	563.8	29.0
r) 湖北	159.8	56.5	6.6	11.7	1483.0	31.9	1461.5	25.9
s) 湖南	271.8	105.2	8.7	16.8	1124.0	20.1	2249.1	43.5
t) 广东	286.3	118.1	10.4	21.5	1558.3	39.4	1794.1	37.0
u) 广西	159.4	82.8	4.3	11.2	1105.3	35.7	1213.2	31.5
v) 四川	381.4	76.4	9.8	9.8	624.3	15.0	2348.5	23.5
w) 云南	113.2	55.3	5.8	14.2	807.2	10.0	846.8	20.7
x) 贵州	60.2	42.1	2.4	8.4	528.7	3.8	494.6	17.3
y) 上海市	87.4	323.6	8.9	164.8	4709.4	85.4	475.3	88.0

z) 资料来源：江西省统计局

Table 2-1. Comparison of the Level of Agricultural Modernization in Jiangxi With 13 Southern Provinces (or Municipalities)
(1978)

Key: a) Province (or municipality)
b) Particulars
c) Amount of chemical fertilizer applied (10,000 tons)
d) Average amount of fertilizer applied per mu of cultivated land (jin)
e) Agricultural use of elec-ricity (100 million kWh)
f) Average use of electricity per mu of cultivated land (kWh)

g) Average amount of farm machinery power (horsepower) per 10,000 mu of cultivated land
h) Percentage of cultivated land area farmed by machines
i) Farmland area producing consistently high yields despite drought or waterlogging (10,000 mu)
j) Percent of total cultivated land area
k) Nation as a whole
l) Total for 13 southern provinces (or municipalities)
m) Jiangxi
n) Jiangsu
o) Zhejiang
p) Anhui
q) Fujian
r) Hubei
s) Hunan
t) Guangdong
u) Guangxi
v) Sichuan
w) Yunnan
x) Guizhou
y) Shanghai
z) Source of data: Jiangxi Provincial Statistical Bureau

C. Emergence of a New Look in Mountain Region Construction

Hill and mountain regions account for about two-thirds of the province's land area. Today 159 reclamation farms exist in the province's mountain regions (not including state-owned farms, superior livestock breeding farms and aquatic products farms). They have more than 1 million mu of cultivated land, operate more than 7.4 million mu of forestlands, more than 90,000 mu of tea groves, and more than 40,000 mu of fruit orchards. They annually produce several hundred million jin of grain, several million jin of oil-bearing crops, several hundred thousand cubic meters of timber, and large quantities of live hogs, tea, fruit, and such agricultural and sideline products. Most farms have achieved self-sufficiency in grain, oil and meat, and in meeting expenses, and numerous farms show surpluses, and have become socialist commodity production bases. During the past 20 years, state-owned land reclamation farms throughout the province have afforested 2,37 million mu and produced more than 3.8 million m^3 of timber. They have provided the state with 2.64 million m^3 for a 65 percent commodity rate. They have produced 54.7 million stalks of moso bamboo, of which 42 million stalks have been supplied the state for a 77 percent commodity rate. In addition, they have provided the state with large amounts of tea, fruit and livestock products.

D. Burgeoning of the Five Occupations, All-round Development of Farming, Forestry, Animal Husbandry, Sideline Occupations and the Fishing Industry, and Steady Increase in Output of Agricultural Products

Taking 100 as the output value for all agriculture in 1949, it was 153.3 for 1982; 183.1 for 1957; 224.6 for 1965; and 350 for 1979, a 2.4-fold increase during a period of 30 years. A look as several major production categories shows the following increase situation:

Gross grain output:	Up 107 percent for 1965 versus 1949; Up 234.6 percent for 1979 versus 1949;
Gross cotton output:	Up 2,881.3 percent[2] for 1965 versus 1949; Up 2,622 percent for 1979 versus 1949;
Gross fats and oils output:	Up 125.5 percent for 1965 versus 1949; Up 250 percent for 1979 versus 1949;
Number of live hogs in inventory	Up 177.4 percent in 1965 versus 1949; Up 358.3 percent for 1979 versus 1949;
Gross output of aquatic products	Up 185.3 percent for 1965 versus 1949; Up 182.8 percent for 1979 versus 1949;
Afforested area	Up 3,899 percent for 1965 versus 1952; Up 3,082 percent for 1979 versus 1952;
Timber output	Up 137 percent for 1979 versus 1952.

E. Appearance of a Large Number of Advanced Models in Agricultural Production

In the process of developing agricultural production following liberation, a large number of advanced models appeared on the province's agricultural production frontline who had changed the production situation rapidly, tremendously increased output, had made great contributions to the country, and in which the level of commune member participation had been high. They persevered in proceeding from realities, conscientiously pursuing a program of "taking grain as the key link, all-round development, suiting general methods to specific circumstances, and proper concentration." They carried forward a revolutionary spirit of self-reliance and arduous struggle, strove to change production conditions, and did a good job of combining the diligent study of advanced experiences from elsewhere with making the most of local strengths in an effort to realize all-round development of farming, forestry, animal husbandry, sideline occupations and the fishing industry. In 1979, eight of the province's counties, namely Shanggao, Nancheng, Nanchang, Nanfeng, Gao'an, Xingan, Guangchang, and De'an exceeded "The National Program For Agricultural Development" in grain yields per mu. Gross output was more than three times more, or cllse to three times more, than 1949. Grain yields averaged 1,000 jin per capita of agricultural population, 300 jin of which was provided the country. Net income averaged 100 yuan, and grain rations reached more than 600 jin per capita (See Table 2-2) Eight counties or municipalities that surpassed "The National Program For

2 The province's gross cotton output for 1965 was figured on the basis of the 954,000 dan figure reported to the state. Had it been figured on the basis of the actual 1.04 million dan output, this figure would be 3,150 percent.

Agricultural Development" with more than three times the 1949 gross output were Pingxiang City, Yujiang, Xingzi, Jinxian, Yushan, Dexing, Shicheng, and Hukou. Pengze County contributed an average of more than 60 jin of ginned cotton per capita of agricultural population, with more than 100 jin of ginned cotton per mu. Jiujiang County had ginned cotton yields of more than 100 jin per mu with each person contributing more than 30 jin of cotton to the country. Hukou and Ruichang counties made contributions to the country of more than 20 jin of ginned cotton per capita; and Xinyu and Duchang counties contributed more than 10 jin per capita of ginned cotton. Counties in which output of fats and oils averaged 10 jin per capita making a contribution to the country of more than 5 jin per capita included Gao'an, Yichun, Jinxian, Hukou, Xingguo, Jiujiang, Yongxiu and Jiujiang City. In addition, Boyang, Duchang, De'an, and Yongxiu counties produced yields of fats and oils close to 10 jin per capita and provided the country with more than 5 jin per capita. Nine counties including Shanggao, Wannian, and Dongxiang averaged two head of live hogs per agricultural household in inventory at yearend, and provided the country more than one head each. The apparance of these advanced models demonstrates the tremendous potential for development of agricultural production in this province, and has established examples to be emulated on the agricultural front that will inevitably become a force that propels further development of agricultural production.

Second Section. Present Status of Agricultural Production

1. Basic Features of Agricultural Production

A. Agricultural production categories are diverse and possess the features of agriculture south of the Yangtze River in general.

Plains, basins, hills, and mountainlands wind their way across the province; the river and lake area is broad, and climate varies from place to place. Natural conditions and natural resources are plentiful and varied, and provide a broad arena for agricultural activities of all kinds. During the long historical process of agricultural activity, the province's working people have made full use of surpassing natural conditions to develop a diversified agricultural economy of substantial proportions. In the farming industry, production of grain crops, principally paddy rice, has been predominant. Wheat, oats, barley, soybeans, sweet potatoes and miscellaneous grains other than wheat and rice also have a definite place. All sorts of cash crops are grown including cotton, oil-bearing crops, sugarcane, hemps, tobacco, tea, fruit, mulberry and medicinal herbs. In the field of forestry, felling thrives in the mountainlands that ring the province, and in the farflung low hills and downlands the growing of economic forest trees such as tea oil is found everywhere. Breeding and catching of fish is done in Boyang Lake and in numerous other lakes, reservoirs and rivers, and development of the fishing industry shows bright prospects. All this shows the variety of the province's various kinds of agricultural production, which is similar to other provinces in south China and has the same overall features of agriculture elsewhere south of the Yangtze River.

表2—2 江西省农业生产发展速度较快、生产和收入水平较高的十二个县

县名	农业总产值比1949年增长倍数	人平农业产值（元）	粮食总产量比1949年增长倍数	粮食耕地亩产（斤）	人平生产粮食（斤）	人平提供商品粮（斤）	人平纯收入（元）	人平口粮（斤）
全省水平	2.4	193	2.3	833	943	203	89.3	576
南昌	5.2	203	4.8	1024	1318	421	112	626
南丰	缺	324	4.6	930	1352	352	134.1	608
南城	8.7	247	4.0	1056	1382	387	116	658
德安	3.2	245	3.5	895	1108	322	116.6	636
上高	8.6	324	3.1	1047	1496	407	151.4	667
高安	2.5	271	3.0	904	1317	325	128	706
广昌	缺	194	2.7	832	1134	317	111.6	628
新干	4.8	258	2.4	866	1526	447	153.6	776
奉新	3.8	256	2.7	761	1473	437	140.9	595
进贤	6.2	213	4.0	896	1085	240	113	606
分宜	5.1	224	2.8	969	1113	210	113	630
余江	2.8	197	3.3	1018	1172	333	96	603

资料来源：江西省农委

Table 2-2. Twelve Counties in Jiangxi Province in Which Agricultural Production Has Developed Fairly Rapidly and in Which Production and Income Levels Are Relatively High

Key:
a) County
b) Times increase in agricultural gross output value as compared with 1949
c) Average per capita output value of agriculture (yuan)
d) Times increase in gross grain output as compared with 1949
e) Grain yields per mu (jin)
f) Average per capita grain production (jin)
g) Average amount of commodity grain provided (jin)
h) Average per capita net income (yuan)
i) Average per capita grain ration (jin)
j) Provincial level
k) Nanchang
l) Nanfeng
m) Nancheng

n) De'an
o) Shanggao
p) Gao'an
q) Guangchang
r) Xin'gan
s) Fengxin
t) Jinxian
u) Fenyi
v) Yujiang
w) Source of data: Jiangxi Provincial Agricultural Commission

B. Grain Production Holds Dominant Position, and Economic Diversification Awaits Further Development

Despite the numerous kinds of agricultural production in the province, thedominant position of grain production is very conspicuous. Output value of grain crops amounts to 60 percent of the gross output value of all agriculture. In terms of area sown, grain alone accounts for 67 percent of the area sown to farm crops in the province, while cash crops account for only 8.2 percent. If green manure is not included, cash crops account for 10.7 percent (1979 figures). Even though the province has vast mountainlands, numerous lakes and rivers, all sorts of speical local products from mountain forests, extraordinarily abundant aquatic product resources, and substantial wild-growing raw materials; nevertheless, economically diversified production is still very weak in rural areas. (See Table 2-3). Forestlands and water surfaces in use in the whole province cover approximately 130 million-odd mu, which is more than three times the present amount of cultivated land. But output value of forestry, animal husbandry, sideline occupations and the fishing industry amounts to only 40 percent the output value of the farming industry, and amounts to less than 30 percent of the gross output value of all agriculture. This fairly undiversified pursuit of grain, and this practice of farming must be turned around as quickly as possible. From now on, it will be necessary to implement correctly and completely a program of "simultaneous development of grain and cash crops," and "simultaneous development of the five occupations of farming, forestry, animal husbandry, sideline occupations and the fishing industry, doing things genuinely in accordance with natural laws and economic laws, conscientiously carrying out surveys of natural resources and agricultural zoning work, and formulating plans for the all-round development of farming, forestry, animal husbandry, sideline occupations and fishing industry production in accordance with agricultural zoning so as to make full use of the province's superior geographic conditions and abundant natural resources. It will be necessary to suit general methods to specific circumstances, to open broad avenues, and to do a good job of farming, breeding, gathering, processing, catching, and all farming, forestry, animal husbandry, sideline occupation and fishing industry production that can increase national, collective and individual wealth, making the land yield its fullest and people exert their talents to the utmost so that the entire rural economy burgeons and the broad masses of people become rich.

表2—3　　　　　　　　　　（以农业总产值为100）

	农业% a)	林业% b)	牧业% c)	副业% d)	其中社队工业产值% e)	渔业% f)
g)全国	66.9	2.9	13.9	15.1	12.5	1.2
h)江西	71.4	4.2	10.5	13.1	6.1	0.8
i)江苏	63.5	0.7	12.9	21.5	21.0	1.4
j)浙江	60.9	2.6	16.3	16.4	14.1	3.8
k)安徽	76.1	1.3	12.7	8.9	5.9	0.5
l)福建	62.7	5.7	10.3	16.4	11.4	4.9
m)湖北	70.7	4.2	12.7	11.6	8.2	0.8
n)湖南	69.5	3.3	15.2	11.2	8.1	0.8
o)广东	62.5	8.5	12.7	13.0	8.6	3.4
p)广西	71.3	4.8	11.6	11.4	7.6	0.9
q)四川	70.6	1.9	20.0	7.3	缺	0.2
r)云南①	66.2	5.7	16.4	11.5	7.3	0.2
s)贵州	64.0	3.7	17.5	14.8	5.6	0.1
t)上海	43.7	0.3	16.4	36.1	35.4	3.5

v)①云南省为1978年资料。　　　　u)资料来源：江西省农业厅计统处

Table 2-3. Structure of Agricultural Gross Output Value in Jiangxi Province in 1979 and a Comparison With Each South China Province

(Gross Output Value of Agriculture Equals 100)

Key:
a) Farming
b) Forestry
c) Animal husbandry
d) Sideline occupations
e) Percent output value of other commune and brigade industries
f) Fishing industry
g) National
h) Jiangxi
i) Jiangsu
j) Zhejiang
k) Anhui
l) Fujian
m) Hubei

n) Hunan
o) Guangdong
p) Guangxi
q) Sichuan
r) Yunnan[1]
s) Guizhou
t) Shanghai
u) Source of data: Statistics Department, Jiangxi Provincial Department of Agriculture

[1] Yunnan data is for 1978

C. Definite Commodity Nature of Grain, Oil, Timber and Bamboo Production

As a result of the influence of natural conditions, the traditional background, and historical development, yet another feature that has occurred in the province's agricultural production is the definite commodity nature of grain, oil, timber and bamboo production.

Grain production dominated by the growing of paddy rice not only forms the foundation of the province's agricultural production, but over the years a substantial amount of grain has been shipped out of the province to assist national reconstruction. Jiangxi Province has long been one of the main sources of commodity grain in the country. With approximately 2.5 percent of the total cultivated land area of the country, Jiangxi has accounted for about 4 percent of the country's grain output. In terms of net shipments of commodity grain, Jiangxi accounts for more than 10 percent of the national total (See Table 2-4). With the building of commodity grain production base on the Boyang Lake plain, the amount of commodity grain that the province provides the country must certainly increase.

项目 b) / 年份 a)	耕地面积 c)		粮食总产量 d)		征购粮总数 e)		净调出商品粮 f)	
	占全国%g)	占13省%h)	占全国%g)	占13省%h)	占全国%g)	占13省%h)	占全国%g)	占13省%h)
1965	2.6	6.6	4.1	6.7	5.2	7.8	13.8	16.2
1971	2.5	6.3	3.9	6.6	4.0	7.7	14.4	17.3
1975	2.5	6.4	3.7	6.5	4.3	7.7	7.7	13.4
1979	2.5	6.4	4.0	6.7	4.8	8.0	*11.9	*16.1

i) * 系按预计数计算的

j) 资料来源：江西省农委

Table 2-4. Jiangxi Province Cultivated Land Area, Gross Grain Output and Commodity Grain Province as a Perdentage of the National Total and of the Total For 13 South China Provinces (or Regions)
[Key on following page]

Key: [for Table 2-4]

a) Year
b) Particulars
c) Cultivated land area
d) Gross grain output
e) Total state grain purchases
f) Net outshipment of commodity grain
g) Percentage of national total
h) Percentage of total for 13 provinces (or regions)
i) Figured on forecast amounts
j) Source of data: Jiangxi Provincial Agricultural Commission

JIangxi Province has also a substantial amount of fats and oils, having produced 28,128,000 jin in the all-time high year of 1959. During the past 10-odd years, as a result of the interference and destruction caused by the ultraleftist line of Lin Biao and the "gang of four," very great fluctuations occurred in outputs of oil-bearing crops such as rapeseed, peanuts and sesame. This plus the natural increase in the province's population and an increase in the amount of edible oil sold has meant a relative decline in the amounts shipped out of the province. However, with stringent efforts, the potential for commodity production in this regard is still very great.

D. Improvement of Production Patterns, But Continued Imbalance in Levels of Development.

Accompanying the gradual deepening of socialist transformation as well as the beginnings of progress in the modernization of agriculture has been a change in dispersed agricultural patterns formed in the long process of development of a small-scale agricultural economy. A group of concentrated production areas varying in size and scale of production or commodity production bases have begun to form and develop in places with relatively favorable conditions. Examples are grain production on the Boyang Lake plain and in the Jitai Basin, cotton in northern Jiangxi, sugarcane in southern JIangxi, tea in eastern and western Jiangxi, forestry in the mountain regions around the fringes of the province, as well as aquatic products all around Boyang Lake. All are of definite regional significance, and large amounts of commodities are produced. In another regard, as a result of natural conditions, population, labor forces and regional variations in the existing foundation and in the levels of administration and management, agricultural production levels of individual regions are very imbalanced. Take grain production, for instance. In a few counties and cities where yields per unit of area are fairly high such as Pingxiang City, Yichun County and Guangfeng County, grain yields already amount to more than ½ ton per mu. At the same time, in some low-yield regions, yields have fluctuated between 500 and 60 jin per mu. Gaps in production levels and regional variations also exist to one degree or another in the levels of production of cash crops and other forestry, animal husbandry, sideline occupation and fishing industry production. This shows that a very great potential still exists for development of the province's agricultural production.

2. Current Status of Land Use and Future Potential

Jiangxi Province's totals 166,600 sq km in land area, which converts to 249.9 million mu. There are 38 million mu of cultivated land, 91.63 million mu of forests, 24.64 million mu of other land used for forestry and 2.57 million mu (1979 figure) of river, lake, reservoir and pond water services for the breeding of aquatic products, plus a total of 160 to 170 million mu of grassy mountains and grassy slopes currently being used for grazing, or about 65 percent of the total land area in the province. The overall land use situation is shown in the following table:

表2—5 江西省土地利用情况

a）项目	b）面积（万亩）	c）构成（%）
d）耕地	3800	15.21
e）林地	11627	46.53
f）其中：森林	9163	
g）宜农、宜林、宜牧荒山荒地	4477	17.92
h）河、湖、库、塘水面	2500	10.00
i）其中：可养殖面积	403	
j）其他	2586	10.34
k）全省总计	24990	100.00

1）注：森林面积主要包括用材林、竹林、经济林、防护林、薪炭林五种林分用地总面积。

Table 2-5. Land Use in Jiangxi Province

Key:
a) Particulars
b) Area (10,000 mu)
c) Structure (%)
d) Cultivated land
e) Forestland
f) Including: dense forests
g) Barren mountains and wastelands suitable for farming and forestry
h) River, lake, reservoir, and pond water surfaces
i) Including: area that can be used for breeding
j) Other
k) Total for whole province
l) Note: Dense forest area includes mostly the total area of timber forests, bamboo forests, economic forests, shelter forests and firewood forests.

Cultivated land in the province amounts to 15.2 percent of the province's total land area, which is higher than the national reclaimed and cultivated land rate (10.33 percent), giving Jiangxi seventh place among the country's southern provinces. (See Table 2-6)

The distribution of cultivated land is often influenced by natural conditions, the history of the development of cultivation and other socio-economic factors. Approximately 36 percent of all the cultivated land in the province is found in mountain regions, 43 percent in hill regions and 21 percent in plains regions. Around Boyang Lake in the plains region of the lower reaches of the five rivers, transportation is convenient and the economy well developed. Population is concentrated, and the area was developed fairly eraly, so the land has been fully developed for use, and the cultivation index is as high as 50 percent. Extending outward in all directions, most of the land is rolling and uneven hills and downlands where the cultivation index is about 20 percent. This includes places such as the northeastern Jiangxi hill region, the banks of the middle reaches of the Gan River, and along the Zhejiang-Jiangxi railroad line where the cultivation index ranges from between 20 and 30 percent. In the mountain regions, the mountain ranges meander and the terrain is fairly craggy; moisture and heat conditions are poor as compared with the plains and low hills. Furthermore, movement is blocked, the population is meager and land cultivation is definitely limited. Cultivated land is generally scattered through river valleys and mountain basins, and the cultivation index is mostly less than 10 percent. For example, in Chongyi County in Gannan Prefecture, which is largely a mountain region, the cultivation index is only 4.7 percent. In the "three souths" region, it is also less than 6 percent in the main. At Tonggu and Wuning in the mountain region of northwestern Jiangxi, it is somewhat less than 5 percent.

A look at the types of cultivated land use shows the province's wetland area to be more than 31 million mu, or 82 percent of the total cultivated area. Among the provinces of south China, Jiangxi is one of the provinces with a fairly high percentage of wetlands (See Figure 207). This is mostly because of the large amount of precipitation the province receives, the dense lake and river network and the relatively copious supply of water. In addition, it is also closely related to the fairly small proportion of drylands that have been developed.

In terms of regional distributions the percentage of wetlands is especially high, reaching more than 95 percent in some places having graben valleys and abundant sources of water, such as the Fu River basin and a vast area to its east. In the western mountain region south of Pingxian, it is also approximately 90 percent. On the other hand, in all the counties along the Yangtze River and all around Boyang Lake where the soil is fairly sandy and its water retention ability weak, the percentage of wetlands is relatively small, being only about 50 percent in the counties along the banks of the Yangtze River.

表 2—6 江西省土地与耕地面积同南方各省、市（区）比较

省 a）区	b）土地面积 e）万平方公里	万 f）亩	c 耕地面积（1979年）万亩 f）	g）占全国%	d）垦殖指数（1979年）
h）全国	960.00	1440000	149247.1	100.00	10.36
i）江西	16.66	24990	3800.0	2.55	15.20
j）江苏	10.22	15320	6975.6	4.67	45.50
k）浙江	10.18	15270	2747.8	1.84	18.00
l）安徽	13.99	20990	6683.6	4.48	31.84
m）福建	12.31	18470	1942.0	1.30	10.51
n）湖北	18.75	28130	5631.8	3.77	20.02
o）湖南	21.05	31580	5160.6	3.46	16.34
p）广东	22.10	33050	4827.1	3.23	14.61
q）广西	23.10	34550	3941.3	2.64	11.40
r）四川	56.60	85350	9937.5	6.66	11.64
s）云南	43.62	65430	4171.0	2.79	6.37
t）贵州	17.40	26100	2847.7	1.91	10.91
u）上海	0.61	917	533.6	0.36	58.19

v）资料来源：江西省农委

Table 2-6. Comparison of Jiangxi Province's Land and Cultivated Land Area With Other Provinces, Cities (or Prefectures) in South China

Key:
- a) Province
- b) Land Area
- c) Cultivated land area
- d) Cultivation index (1979)
- e) 10,000 sq km
- f) 10,000 mu
- g) Percent of national total
- h) National
- i) Jiangxi
- j) Jiangsu
- k) Zhejiang
- l) Anhui
- m) Fujian
- n) Hubei
- o) Hunan
- p) Guangdong
- q) Guangxi
- r) Sichuan
- s) Yunnan
- t) Guizhou
- u) Shanghai
- v) Source of Data: Jiangxi Provincial Agricultural Commission

Drylands, which account for a not very large proportion of the province's cultivated land, are fairly scattered in mountain regions and the slopes of hill regions as well as on downlands where sources of water are lacking, and on alluvial flats where storing and conservation of water is relatively poor.

表2—7 江西省水旱田构成与南方各省、市比较

省 a) 区	b) 全国	c) 江西	d) 江苏	e) 浙江	f) 安徽	g) 福建	h) 湖北	i) 湖南	j) 广东	k) 广西	l) 四川	m) 云南	n) 贵州	o) 上海
p) 水田 (%)	26	82	60	79	40	80	53	77	76	66	50	38	41	89
q) 旱地 (%)	74	18	40	21	60	20	47	23	24	34	50	62	59	11

Table 2-7. Structure of Wetlands and Drylands in Jiangxi Province and Comparison with South China Provinces and Cities

Key:
a) Province
b) Nationally
c) Jiangxi
d) Jiangsu
e) Zhejiang
f) Anhui
g) Fujian
h) Hubei
i) Hunan
j) Guangdong
k) Guangxi
l) Sichuan
m) Yunnan
n) Guizhou
o) Shanghai
p) Wetlands
q) Drylands

The multiple-cropping index is also an important indicator of balance in the extent of a region's land use. As a result of efforts to increase farm crop outputs following liberation, the province's multiple-cropping index rose steadily with constant improvements to the farming system. Today the area of the province planted to farm crops has reached 85,529,500 mu (1979). The multiple-cropping index for the whole province, green manure excluded, has risen from the 123.2 percent of 1949 to 173.9 percent in 1979. If green manure is included, it rose during the same period from 135 percent to 225 percent, which is lower than that of neighboring Zhejiang Province (244.5 percent) and Hunan (239.9 percent), but higher than that of Hubei (213.4 percent), Anhui (182.9 percent) and Fujian (204.9 percent).[3]

Similarly, as a result of the effects of natural conditions and socio-economic conditions, particularly factors such as population density and the amount of cultivated land for which each member of the agricultural workforce is responsible, the multiple-cropping index varies

[3] Data on Zhejiang, Hunan, Hubei, Anhui, Anhui, and Fujian is for 1977; the multiple-cropping index for the province as a whole was 228.5 percent in 1977.

markedly from one region to another in the province. In the north, especially in the counties on the Boyang Lake plain and along the railroad line where the land is flat, where the land was opened to cultivation early, where population is dense and where each member of the agricultural work force is responsible for tilling a small amount of cultivated land, the multiple-cropping index is high. In the south, especially in the counties along the route that population from the north took in ancient times in large-scale migrations southward to Fujian and Guangdong as, for example, in Xinfeng, Quannan, Dingnan, Dayu, Yudu and Ruijin, the multiple-cropping index is also relatively high, mostly greater than 185 percent. The counties in the middle of the province have the lowest population density in the province, and the multiple-cropping index in most places there is below 170 percent.

Table 2-8. Changes Over the Years in Jiangxi Province's Multiple-Cropping Index (Exclusive of Green Manure)

	1949	1952	1957	1965	1979
Multiple Cropping Index (Percentage)	123.2	141.3	167.4	166.2	173.9

Source of data: Jiangxi Provincial Statistical Bureau

Overall, the province's land utilization rate is gradually rising as agricultural production develops, and with advances in thebuilding of modern socialist agriculture, the suiting of general methods to local situations to reform the farming system, plus the all-round development and rational distribution of grain, cotton, oil-bearing crop, hemp, silk, tea, sugar, vegetable, tobacco, fruit, medicinal herbs and miscellaneous production, in particular, the land utilization rate must inevitably become more rational. It should be realized, however, that the province has an additional approximately 10 million-odd mu of wastelands suitable for farming awaiting gradual development for use. In addition, it has more than 30 million-odd mu of barren mountains and hills suitable for forestry and animal husbandry awaiting afforestation and use in multiple ways. Of the province's more than 4 million mu of rivers, lakes, reservoirs and ponds usable for breeding, only slightly more than one-half are being used for the breeding of aquatic products. Only slightly more than 10 million-odd mu of the 38 million mu of cultivated land in the province has been built into farmland producing consistently high yields. For the remaining 27 million-odd mu, some produces high but inconsistent yields; some produces consistent but not high yields or niehter high nor consistent yields; and some awaits further improvement of production conditions and upgrading of yields per unit of area. A look at the multiple-cropping index shows it to average only slightly more than 170 percent for the province as a whole at the present time. Clearly land-use potential is still very great. Full and rational development for use of the province's plentiful land resources, following the principles of suiting general methods to specific circumstances and equitable crop patterns, maximizing advantages and minimizing disadvantages, making sure that land suited for farming is used for farming, land suitable for forests

is used for forests, land suitable for animal husbandry is used for animal husbandry, and land suitable for the fishing industry is used for the fishing industry for a combination of farming, forestry, animal husbandry, sideline occupations and the fishing industry with all-round development of agricultural production is one of the province's major future tasks in the building of agriculture. This requires full and thoroughgoing investigation and research on natural agricultural resources, further good work on soil surveys, finding out what resources are available, doing good planning and gradually solving problems in a planned way.

3. Grain Crop Production and Patterns

Jiangxi Province is one of the major grain-producing areas in which the growing of paddy rice predominates south of the Yangtze River. It grows a large variety of grain crops and has a long history of growing them. Historically the area sown to grain crops has accounted for between 60 and 70 percent of the total area of the province sown to farm crops. Among grain crops, the arja sown to paddy rice year after year has also accounted for between 85 and 90 percent of the total area sown to grain crops in the whole province, and gross output of paddy amounts to approximately 95 percent of the province's gross output of grain (See Table 2-9). Thus, grain production, and particularly paddy rice production, is the major ingredient of the province's agricultural production.

A. Major Grain Crops and Crop Patterns

The province is located in a subtropical monsoon climatic region where the amount of heat is plentiful and rainfall copious. It has outstanding natural conditions for development of rice, wheat, tubers, and miscellaneous grains other than rice and wheat. As a result of regional variations in natural and socioeconomic conditions, various grain crops exhibit various different regional patterns. Paddy rice is grown on plains and in hill and mountain regions throughout the province. Wheat is found mostly in northern and northeastern Jiangxi, and tubers (mostly sweet potatoes) are found mostly in central and southern Jiangxi.

1. Paddy rice. Paddy rice is a warmth-loving crop. Early0, intermediate- and late-crop rice all have relatively high requirements for heat. Minimum temperature for the sprouting of seeds is an average daily temperature of 12°C (for xian rice), and 10°C (for geng rice), and temperatures during thefull heading period should average 23°-24°C.

The amount of sunshine paddy rice requires varies as the period required for maturation of different varieties varies: Early rice varieties are not sensitive to the length of daily sunshine, but requirements of classic late paddy varieties are strict while early-ripening intermediate rice varieties have characteristics close to those of early rice. However, late-ripening intermediate rice varieties exhibit characteristics close to those of late rice. Results of experiments performed by scientific research departments have shown the following with regard to water consumption per mu of paddy rice: For early rice, 222-337 m^3; for second-crop

late rice, 238-455 m^3. Jiangxi Province is a part of the country's largest area growing paddy rice--the rice area of the middle reaches of the Yangtze River. It accounts for 15 percent of all the rice sown in that area and 10 percent of the area sown to paddy rice in the whole country (1977 figures).

表二—9 一九七九年江西省粮食作物生产构成

项 a) 目			b) 播种面积 数 d) 量 (万亩)	占粮食作物的 e) %	c) 总产量 数 f) 量 (亿斤)	占粮食作物 g) 总产量的%
h) 粮食作物			5766	100.00	259.3	100.00
i) 稻谷	j) 稻谷小计		5080.2	88.11	247.0	95.26
	k) 其中	早 l) 稻	2487.9	43.15	136.0	52.45
		中 m) 稻	40.7	0.71	2.3	0.89
		一 n) 晚	399.1	6.92	21.3	8.21
		二 o) 晚	2152.4	37.33	87.4	33.71
小 p) 麦			204.1	3.54	2.8	1.08
薯 q) 类			181.1	3.14	5.9	2.27
其他 r) 杂粮			111.9	1.94	1.2	0.46
大 s) 豆			188.8	3.27	2.4	0.93

江西省分县粮食耕地亩产图 t) 资料来源：江西省农业厅计统处

Table 2-9 Composition of Grain Crop Production in Jiangxi Province in 1979

Key:
- a) Particulars
- b) Sown area
- c) Gross output
- d) Amount (10,000 mu)
- e) Percent of grain crop
- f) Amount (100 million jin)
- g) Percent of gross output of grain
- h) Grain
- i) Paddy rice
- j) Paddy rice subtotal
- k) Including
- l) Early rice
- m) Intermediate rice
- n) First late rice crop

[Key for Table 2-9, continued]

- o) Second late rice crop
- p) Wheat
- q) Tubers
- r) Miscellaneous grains other than wheat and rice
- s) Soybeans
- t) Source of data: Jiangxi Provincial Department of Agriculture, Statistical Office

A look at regional patterns shows the proportion of paddy rice to total area sown to farm crops to be generally relatively great in central and southern parts of the province, and less in the north. Because of the large dryland area and the growing of dryland crops, such as cotton and beans, in the counties along the Yangtze River, the percentage of total crop area sown to rice is relatively small at 30 to 40 percent; however, it reaches more than 70 percent in places having little dryland area and in places where the growing of two crops of rice is concentrated.

Though water and heat conditions in the province favor development of double rice crop production, nevertheless, as a result of restrictions imposed by water conservancy and the availability of fertilizer and labor forces, up until 1957 single-crop paddy production held a dominant position in the province. In 1956, the double-crop area for the whole province amounted to only 9.46 million mu, which was only 21 percent of the area sown to paddy rice. All the rest was single-crop rice. After 1957, with development of the capital construction of farmlands centering around the building of water conservancy facilities, vigorous expansion of sources of fertilizer, and gradual improvements in the rational use of the labor force, the area of two rice crops expanded steadily and by 1979 it accounted for 42 percent of the total area sown to rice. Today, two crops of rice are grown everywhere, not only in plains and hill regions that have always had relatively good water conservancy conditions, availability of fertilizer and labor forces, and a foundation in farming, but also in low mountain and high hill regions at a fairly high altitude above sea level (approximately 500 m), in places with poor heat and sunlight conditions, and where the labor force is not too abundant. Still, yields are frequently not high, or else the output of two crops is not as great as former output from one. With the development of hybrid rice in recent years, most of these mountain regions that are at a fairly high altitude above sea level have switched from the growing of two rice crops to a single crop of hybrid rice.

A certain amount of single-crop paddy continues to be grown in the province. A substantial amount of both single-crop early paddy and single-crop late paddy is grown, while the area formerly planted to single-crop intermediate paddy has declined relatively. The growing of single-crop early paddy is concentrated mostly in hill regions, with a certain amount also being planted in plains areas lacking sources of water. For the most part, this growing of early rice has been a change away from the growing of intermediate rice since 1953. As compared with early rice,

both the time for sowing and for harvesting is anywhere from ½ to 1 month earlier than for single-crop intermediate rice. This is advantageous because another fall harvested crop of late sweet potatoes or late soybeans can be grown, because it avoids the regular threat of autumn drought, and because grain production can be expanded where there is a shortage of water. Today, thereis little rest after the first crop of early paddy has been harvested. In hill regions, much planting of miscellaneous grains, such as sweet potatoes, is done. In plains areas along the Zhejiang-Jiangxi Railroad line, more than hlaf the fields are planted to soybeans and sesame.

The growing of a single crop of late rice is divided into two areas. One is in cold waterlogged fields in mountain regions or in narrow valleys among high hills. Sufficient water is still not available in these places, but the water table is high. The number of hours of sunshine daily is relatively short, temperature is relative low, fertilizer decomposes slowly and yields are fairly low. The other area is around the lake and in lowlying areas along the Yangtze River. In such places, the soil is relatively fertile, the amount of daily sunshine plentiful, and the terrain relatively flat. However, such low-lying places frequently accumulate water during late spring or early summer, and it is impossible to keep abreast of the season to plant rice. All that can be done is wait for the waters to abate and plant late. Single-crop intermediate rice is found mostly in hill regions where availability of water is relatively poor and where the soil is not adequately fertile. HOwever, because its period of vegetative growth is long, sunlight and temperature conditions during the period June to September are advantageous for the growth and development of intermediate rice. As a result, in most places intermediate rice yields per mu are not lower, or may be higher, than for early rice. It is usually planted between middle and late April and harvested in late August or early September. However, it is prone to autumn drought before it ripens, and this sometimes impairs yields.

2. Wheat, Tubers, and Other Miscellaneous Grains: Wheat is grown on 3.5 percent of the area sown to grain crops in the province, and output amounts to only 1.1 percent of total grain output (1979 figures). Northern Jiangxi is the main producing area, with an overwhelming majority of the wheat being grown along the rivers north of the Zhejiang-Jiangxi Railroad and on the alluvial drylands around the lake. In 1979, 14 of the major wheat-growing counties including Jinxian, Gao'an, Boyang, Duchang and Jiujiang sowed a total of 1.34 million mu, which was nearly 70 percent of the area sown to wheat in the province. The proportion of wheat grown on drylands in other areas, the cultivation and care, and yields per unit of area are not as good as in the province's northern producing areas. In addition, wheat is grown in paddyfields in some places, but the area is not large. Since it rains a lot during April and May in Jiangxi Province, wheat frequently develops wheat scab, and since care is fairly unintensive as well, wheat yields per unit of area are not high. During the bumper 1979 harvest year, yields averaged only 139 jin per mu. In a few counties with relatively high yields, wheat

yields are also only around 200 jin per mu. In low-yield areas, yields are only 50 to 60 jin per mu. The disparity between high and low yields per mu shows a relatively great potential for increased yields.

The main tuber crop is sweet potato, which occupies 3 percent of the province's total grain crop area and accounts for 2 percent of gross grain output. It is found everywhere, but mostly in central and southern Jiangxi. Early sweet potatoes are usually planted after spring-ripening crops, such as rape and wheat, have been harvested from drylands. Fairly large numbers are grown as late-crop sweet potatoes after early rice has been harvested from wetlands. This is an important measure for making use of fields that would otherwise lie fallow in fall to increase grain output.

Other miscellaneous crops in addition to sweet potatoes include corn, gaoliang, millet, barley, broad beans, peas and buckwheat. These crops are sown on 2 percent of the total grain crop area, and gross output is only 0.5 percent of gross grain output. They are found in scattered places throughout the province, and are an important supplement in making full use of land to increase grain output and to enrich the varieties of grain grown.

3. Soybeans: Soybeans are a pulse crop used as food and for their oil that are of high cash value and extremely broad usefulness. They are rich in both protein and fat, and have important applications in industry as well. Their protein content has been scientifically measured at around 40 percent. Their nutrient value is higher than that of rice, wheat and sweet potatoes, or even higher than that of pork, beef and milk. Both the bean cake and the stems of soybeans make fine cattle fodder and fertilizer. Of particular note is that soybeans have root nodules that are able to fix free nitrogen from the atmosphere. Analysis shows soybeans as able to fix between 7 and 10 jin of nitrogen per mu per crop. This is the equivalent of between 35 and 50 jin of ammonium sulfate. Therefore, the growing of soybeans has the special function of promoting soil fertility, improving the soil and increasing crop outputs. Practice has demonstrated benefits from the growing of a crop of soybeans to be no less than from the growing of a crop of late rice.

Jiangxi Province has a long history of growing soybeans. After liberation, plantings increased to more than 4.5 million mu (in 1957). In the past, all soybeans produced supplied the province's own needs, with a large quantity being sent outside the province as well. During the past more than 10 years soybean output has declined. In 1979, the growing area was only 1.89 million mu, and yields were 120-odd jin per mu. The areas east and south of Boyang Lake and the Jitai Basin are the main soybean-producing areas in the province. Soybean varieties are principally early soybeans and late soybeans, the area sown to late soybeans being relatively larger. Usually they are sown after harvesting of the early rice crop. Early soybeans are grown mostly on drylands. They are intercropped with wheat before the wheat is harvested, and after they have been

harvested in early or mid-July, a crop of sesame or swwet potatoes is planted. No matter whether one starts with a concept of changing people's diets of from effectively combining land use with land nurture, future full use of the province's favorable conditions for active revival and development of soybean production holds great importance.

B. Status of Development of Grain Production

Up until the time of liberation, the province's grain production, like all agricultural production, lay in a destitute and deteriorated state. Before the war, the province's maximum gross output of grain reached more than 12 billion jin. On the eve of liberation, however, it was only 7 to 8 billion jin. Following liberation, both the party and government showed extreme concern for taking a firm grip on grain production as an important matter relating to the national economy and the people's standard of living. During the past 30 years, the province's grain growing area has expanded steadily; yields per mu have risen constantly, and gross output has increased greatly. In 1979, the area of the province sown to grain crops stood at more than 57.66 million mu, up 46 percent from 1949. Yields averaged 833 jin per mu of cultivated land, 3.4 times the 1949 figure, and gross output was 25.93 billion jin or 2.3 times the 1949 figure. The province's grain production has developed fairly rapidly, with fairly great increases occurring mostly during five periods as follows: One was in 1952 when rural productivity was greatly emancipated as a result of land reform and grain production climbed from 8.5 billion jin in 1951 to 11.5 billion jin, an increase of 3 billion jin in a single year. The second was from the period in 1955 when the cooperativization of agriculture was at its zenith until the formation of people's communes in 1958, a period of 4 years of sustained increase in output. The third was the period 1963-1965, when the four-point program for the national economy of "readjusting, restructuring, consolidating, and improving" was diligently carried out and a major increase in grain yields occurred. During these 3 years, grain output increased by close to 4 billion jin, an increase averaging more than 1.3 billion jin per year. The fourth was 4 years of sustained increased in output of more than 4.5 billion jin from 1968 to 1971. The fifth followed the smashing of the "gang of four," when giant strides were tkaen for 3 consecutive years, grain output increasing by a total of 5.43 billion jin for those 3 years putting an end to more than 10 years in which grain production fluctuated back and forth with no forward movement to reach an all-time high.

Despite substantial growth since founding of the People's Republic in overall grain production, the province remains unable to meet needs for the modernization of agriculture and for steady development of the national economy and improvement in the people's standard of living. Today the province's grain crop yields per unit of area are relatively low, and grain crop patterns lack rationality. Production levels are very uneven from one area to another. As a result of reductions in the cultivated land area, a not very rapid increase in the agricultural labor productivity rate, along with fairly substantial increases in population, the

average amount of commodity grain that each unit of the agricultural labor force is able to provide has declined relatively (See Table 2-10). Therefore, hastening development of the province's grain production is an extremely urgent task.

表2—10 江西省按农业人口平均粮食生产、贡献水平变化情况 单位：斤

年 a) 份 / 项 b) 目	人平产粮 c)(农业人口)	d) 劳平产粮	人平贡献 e)(农业人口)	f) 劳平贡献	人平占有粮食 g)(总人口)
1949	674	1384	/	/	590
1952	810	1916	314/1953	755/1953	687
1957	825	1853	274	615	707
1965	862	2045	265	628	726
1970	885	2294	241	624	763
1979	943	2554	203	549	803

h) 资料来源：江西省农委

Table 2-10. Average Grain Production Per Capita of Agricultural Population and Status of Changes in Levels of Contributions in Jiangxi Province

Units: Jin

Key:
- a) Year
- b) Particulars
- c) Average per capita grain output (agricultural population)
- d) Average per laborer grain output
- e) Average per capita contribution (agricultural population)
- f) Average per laborer contribution
- g) Average grain per capita (total population)
- h) Source of data: Jiangxi Provincial Agriculture Commission

C. Major Ways in Which to Hasten Further Development of Grain Production

In view of natural conditions and socioeconomic conditions as well as characteristics of agricultural production in different parts of the province, adoption of effective measures for development of the production of grain and cash crops, vigorous increase in yields per unit of area, an increase in gross output, and all-round development of farming, forestry, animal husbandry, sideline occupation and fishing industry production are major goals and tasks in the province's future building of agricultural production. On the basis of practical experience for many years in the province, emphasis should go to the following several points:

1. Major efforts to harness waters and improve soil to build consistently high-yield fields. Many years' practice has shown the main elements affecting the not very rapid speed of development of grain production in the province to be too small a farmland area from which crops may be harvested despite drought or waterlogging and too few consistently high-yield fields. Development of capital construction for farmland water conservancy and nurture of soil fertility is still unable to keep up with needs for development of large-scale agriculture. The key to future speedup in development of the province's grain output is strict attention to farmland capital construction centering around the harnessing of water and soil improvement. Particular stress must be placed on the transformation of large areas of low-yield fields to promote balanced increase in yields. Basic requirements in building consistently high-yield fields are as follows: (1) in a comprehensive way tackling mountains, water, fields, forests and roads so that water is available when droughts strike, so that water may be drained away when waterlogging occurs, and so as to achieve timeliness, high efficiency, savings of water and low costs; guaranteeing safety against floods with reduction of hidden dangers; (2) raising outputs of green manure and fresh grass, increased applications of fine-quality organic fertilizer, rational applications of chemical fertilizer and steady increase in soil fertility so that the cultivated soil layer has a plentiful organic content, so that the more the soil is used the more fertile it becomes, and so that the more the nature of the soil changes, the better it will become; (3) making ditches, canals, roads and forests part of an integrated while, separating drainage and irrigation systems, getting rid of irrigation by channeling water along furrows and flood irrigation, and improving water and fertilizer utilization coefficients in order to use the minimum of water and fertilizer to derive the maximum output; (4) sensibly deep plowing, deepening of the cultivated layer, improving soil structure; and enchancing the soil's ability to store water, retain fertilizer, and supply fertilizer; (5) places having a high water table should lower the water table and guard against secondary gleying of the soil; (6) high grain yields per unit of area. Certainly conditions differ from place to place, and specific standards for building consistently high-yield farmlands should not be made uniform. Instead general methods should be suited to specific circumstances on the basis of the actual situation in individual areas for steady increase in the number of consistently high-yield fields.

2. Vigorous attention to the building of commodity grain bases. As a result of the impact of natural and socioeconomic conditions, the commodity grain bases historically formed in the province, as well as the new commodity grain bases that developed after liberation, are concentrated in single tracts. Classified on the basis of their geographic locations, they may be roughly divided into the following three large tracts and two small tracts:

The three large tracts are as follows:

The lower reaches of the five rivers and the Boyang Lake plain, which mostly includes the following 14 counties: Nanchang, Xinjian, Gao'an, Fengcheng, Qingjiang, Linchuan, Jinxian, Dongxiang, Yujiang, Boyang, Leping, Yugan, Wannian, and Anyi.[4] Relatively good conditions for agricultural production may be found here, or else conditions are improving fairly rapidly. The foundation for agricultural production is fairly good, and yields per unit of area are both high and consistent, with a large amount of marketable grain being provided.

Jitai Basin: This includes eight counties as follows: Ji'an, Taihe, Wan'an, Anfu, Jishui, Xiajiang, Xin'gan, and Yongfeng. Though yields per unit of area in these counties cannot equal those of the Boyang Lake plain counties, the population is small relative to farmland; average per capita grain yields are fairly large; achieving self-sufficiency in grain is not a taxing task, and the basin can provide a substantial quantity of marketable grain to the country annually.

Jinxi, Nanchang, Nanfeng, Yihuang, Chongren, Le'an, Guangchang and Ningdu counties in southeastern Jiangxi. Here the average amount of cultivated land per capita is second only to the Jitai Basin, and a great potential exists for grain production. The commodity rate is high, and this base has held first place historically among all the marketable grain bases in the province in the amount of marketable grain provided per capita.

The two small tracts are as follows:

Fengxin, Yifeng, Shanggao, Wanzai, and Yichun counties in northwestern Jiangxi. Production conditions in this area had been fairly poor at one time, but very great changes have taken place in the situation during the past more than 10 years. Grain production has grown rapidly, and the amount of marketable grain provided per capita is second only to that of the grain-producing area in southeastern Jiangxi.

Guixi, Yiyang and Qianshan counties in northeastern Jiangxi. This is an important grain-growing area in northeastern Jiangxi, and its marketable grain rate holds first place among all commodity grain bases in the province. Despite its small scale, production holds an important position in the province.

In 1979, the foregoing 38 grain-producing counties had 50 percent of the population in the province, and 56.4 percent of the cultivated land area. They produced 59.3 percent of the whole province's total grain output, and provided 70.7 percent of the grain sold to the state throughout the province. Their marketable grain rate was 25.7 percent and their net outshipment of crude marketable grain reached 2.603 billion jin, 1.6

[4] The province has designated 22 counties as comprising the Boyang Lake plain commodity grain base. However, since some of these counties produce other crops, such as cotton, only the 14 counties with a substantial grain output and that provide marketable grain have been included here.

times the amount of grain turned over to the state by the province as a whole. The amount of marketable grain provided was 287 jin per capita of agricultural population, much much more than the 203 jin average for the province as a whole (See Table 2-11). The grain production situation in these counties has a great deal to do with the overall situation in grain production for theprovince as a whole. Consequently, concentration of a certain amount of manpower, material and financial resources to build these base counties first holds important strategic significance for accelerating development of grain production throughout the province. The Boyang Lake plain has been designated one of the nine large commodity grain bases in the whole country. The Jitai Basin is also actively creating conditions and striving to become a commodity grain base in the province. The remaining several tracts are likewise taking positive measures on the basis of different conditions and characteristics to suit general methods to local circumstances and provide tailored guidance in diligent efforts.

3. A continued firm grip on early rice and major efforts to increase output of late rice. Early rice is annually grown on about 44 percent of the area sown to grain crops in the province, yet output accounts for more than 50 percent of total annual grain output. To take a firm grip on production of early rice is thus to take a firm grip on more than one-half of annual grain production. A look at climatic characteristics of the province shows ample rainfall during the first half of the year with rising temperatures, favoring the growth and development of paddy rice. Relatively few natural disasters occur ordinarily, and the area from which a crop can be guaranteed is relatively large. During the last half of the year, on the other hand, midautumn drought, serious insect pest infestations and the effects of cold dew winds frequently threaten agricultural production. Additionally, the period of preparation for production of early rice is long and material conditions are relatively good. Practice has shown that full use of these favorable conditions for the planting of more and better early rice so as to harvest a bumper summer grain crop is an important measure for hastening development of the province's grain output.

Double-crop production of late rice has also had an important effect on development of the province's grain production, with output amounting to approximately one-third of the total. Nevertheless, low and inconsistent yields over a long period of time, and great imbalance between one region and another constitute weak links in paddy production. A substantial potential for increased yields exists. If this potential for increased yields is fully appreciated, and if thinking that emphasizes early rice to the neglect of late rice can be overcome and pertinent actions taken to make a breakthrough on this weak link so that yields of late rice per mu catch up with or surpass those for early rice to achieve balanced increases in output for the year as a whole, this would be an important way in which to hasten future development of the province's grain production. Today some of the province's communes and brigades use superior varieties, grow sturdy seedlings, strive to transplant early, do

reasonably close planting and intensify care. They have especially promoted the growing of hybrid paddy on wide areas. As a result, they have had successful experiences with late paddy yields catching up with or surpassing early paddy yields. These experiences should be diligently summarized and promoted in order to give impetus to development of the growing of late rice in a two-crop system in the province.

4. Suiting of general methods to specific circumstances and rational changes in the system. The farming system reflects the efficiency and intensivity of utilization of sunshine and soil resources. An advanced farming system is the foundation for consistently high agricultural yields. Suiting of general methods to specific circumstances, and both active and rational reforms of the farming system are major ways in which to develop agricultural production and increase grain output. They are also one important aspect of the modernization of agriculture. The major farming systems in the province today may be roughly categorized as follows:

(1) A two- or three-crop system each year with the growing of:
green manure-early paddy-late paddy;
rape or wheat or broad beans and peas-early paddy-late paddy;
fallow fields in winter-early paddy-late paddy;

(2) Two crops each year or five crops every 2 years with the growing of:
winter crops or fallow fields-early paddy-late soybeans;
winter crops or fallow fields-early paddy-late sweet potatoes;
winter crops or fallow fields-early paddy-corn-millet;
winter crops or fallow fields-single crop of late or intermediate paddy.

This farming system, whose main component is an increase in the multiple-cropping index, has been summarized and refined from the long experience in production of the province's working people. An overwhelming majority of it suits local production conditions and present levels of production, and plays an important role in tremendously increasing outputs of grain and other crops. Nevertheless, one should realize that with a steady, deepening understanding of crop-growth laws and a constant increase in the modernization of agriculture, some traditional farming systems and farming methods also exhibit insufficiencies and backwardness. As a result of the steady expansion in the three-crop system, in particular, and the increase in the multiple-cropping index, exhaustion of soil fertility has correspondingly increased and the conflict between use and nurture of the soil is already extremely sharp. In order to meet needs for tremendous growth in grain production and all-round development of farming, forestry, animal husbandry, sideline occupations and the fishing industry, it will henceforth be necessary to proceed from different conditions in the different regions of the province, to further summarize and perfect various farming systems suited to the province, and to study and build gradually a farming system that fits in with the needs of modernization. The overall rule in reform of the farming system should be use of different sunlight, heat, water and soil conditions in various places as well as the availability of labor forces and fertilizer plus

traditional practices as a basis, and then to suit general methods to specific circumstances, emphasizing different things in different places and combining use with nurture of the soil for the sake of increased yields during the current year and, even more impornantly, for the sake of increased yields year after year for long-range consistent yield increases. Results from reform of the farming system should benefit both the rational use of all resources and full exploitation of potential for increased yields so as to make a greater contribution of increased output to the country. Reform should also help strengthen and consolidate the collective economy and raise peasant earnings and standards of living, the country, collectives and individuals thereby benefiting. An evaluation of advantages and disadvantages of several major farming systems currently in use in the province is provided below in accordance with these principles:

The green manure-early paddy-late paddy two-crop system: This is the most widespread farming system. It is used on about two-thirds or more of the province's wetland area. Its most salient feature is its ability to make full use of the province's frost-free period, its large amount of rainfall, its copious supplies of water, and such outstanding natural conditions. It both increases tge nyktuoke cropping of paddy rice, develops the growing of pulses for green manure to increase the supply of fertilizer, and is a major way in which to increase grain yields. However, if Chinese milk vetch is grown for years on end, the fields cannot be deeply plowed and sunned during winter and the soil is prone to long-term breakdown. Its physical and chemical properties will change for the worse, and its organic matter will anerobically decompose, producing toxic substances such as hydrogen sulfide. Furthermore, diseases, insect pests and weeds increase, impairing normal rice growth. It will not be easy to increase yields. Chinese milk vetch and rape or wheat should be rotated once every 2 or 3 years so that the paddy will have an opportunity to be turned and sunned during the winter season to improve soil structure, eliminate reduction materials from the soil and eradicate diseases, insect pests and weeds.

Rape-early paddy-late rice three-crop system: This system is also fairly widespread in the province. This is a farming system that both increases grain yields and increases oil-bearing crops for a combination of grain and oil, and combines use of the soil with nurture of the soil. It has bright prospects for development. It should be vigorously advocated and developed, particularly in places where the labor force and animal power is abundant and where fertilizer is fairly plentiful. However, attention must be given to the rational matching of varieties, scientific management, and proper solution to the "three conflicts" (conflicts between seasons, conflicts over the labor force, and conflicts over fertilizer) to win high yields from all three crops.

Table 2-11.
Grain Production and Outshipments From 38 Key Grain-Producing Counties in Jiangxi Province

江西省38个重点产粮县粮食生产和外调情况

项 b) 目 / 县 a) 别	c) 耕地面积 (万亩)			d) 农业人口 (万人)			e) 粮食总产量 (亿斤)			f) 征购原粮总数 (万斤)			g) 纯调出原粮总数 (万斤)		
	57年	65年	79年	57年	65年	79年	57年	65年	79年	57年	65年	79年	57年	65年	79年
h) 重点县合计	2573.4	2340.5	2143.1	816.9	923.3	1375.4	74.82	95.52	153.75	274981	324179	394505	158166	215647	260277
i) 占全省比重(%)	61.0	57.1	56.4	51.5	49.6	50.0	57.1	59.5	59.3	63.3	65.8	70.7			
j) 鄱阳湖地区	1258.0	1131.7	1041.0	433.1	482.5	716.0	37.74	51.26	78.70	139373	170606	203429	71295	117863	136716
k) 南昌县	122.2	106.2	109.0	49.2	55.6	83.9	4.85	7.34	11.06	19977	28821	35287	10800	24293	33173
l) 新建县	98.4	92.4	74.0	28.1	29.3	47.7	2.83	3.96	4.98	11481	13883	14999	8576	11384	7844
m) 安义县	35.8	34.3	28.9	10.1	12.3	16.8	1.03	1.36	2.17	4307	4801	6360	2343	3636	4199
n) 高安县	122.7	113.9	103.6	35.0	39.9	55.0	2.62	4.02	7.24	8700	13163	17837	5610	9280	13254
o) 丰城县	167.2	148.2	134.4	51.9	59.3	85.9	4.50	5.99	9.01	16706	19789	22864	10004	9704	13300
p) 清江县	82.1	74.0	64.9	23.0	25.7	37.2	1.72	2.68	4.50	5861	9367	10949	3229	4201	5570
q) 临川县	114.1	98.1	79.1	44.5	45.7	58.0	4.49	3.96	6.09	15257	14950	13427	4454	11093	11049
r) 进贤县	85.5	80.1	87.4	24.4	27.0	51.4	1.87	2.74	5.58	7454	8931	12334	3279	7124	7446
s) 东乡县	52.3	46.3	43.6	15.5	18.0	28.2	1.38	2.15	3.37	4674	7297	8447	2987	4877	6677
t) 余江县	43.3	34.4	33.9	14.9	17.2	24.4	1.46	2.04	2.86	5076	6374	8136	3639	4736	5079
u) 波阳县	137.1	126.6	120.4	56.7	63.5	94.8	4.12	6.60	9.03	14609	16179	19739	2216	10501	10947
v) 乐平县	72.4	63.9	58.2	30.0	33.1	50.5	2.67	3.22	4.91	9869	9681	12486	4793	4876	4090

[Key to follow]

w) 资料来源江西省农委

Table 2-11 (cont.)

续 1

a) 县别 b) 项目	c) 耕地面积 (万亩) 57年	65年	79年	d) 农业人口 (万人) 57年	65年	79年	e) 粮食总产量 (亿斤) 57年	65年	79年	f) 征购原粮总数 (万斤) 57年	65年	79年	g) 纯调出原粮总数 (万斤) 57年	65年	79年
x) 余干县	82.7	76.0	71.5	31.3	37.9	57.4	2.66	3.45	5.25	9823	11387	14784	5251	7867	10961
y) 万年县	42.2	37.3	32.1	15.5	18.0	24.8	1.54	1.75	2.65	5579	5983	5780	4114	4291	3127
z) 吉泰盆地	545.9	509.4	464.6	130.3	152.9	230.9	12.32	15.34	25.97	47892	55201	67406	26965	36883	44293
aa) 吉安县	112.9	98.8	90.8	30.2	32.1	47.6	2.67	2.80	4.75	10830	9093	11286	5650	5761	6316
ab) 泰和县	88.9	82.6	76.3	20.7	24.5	37.2	2.16	2.48	3.52	9697	9134	9613	6277	6503	5780
ac) 万安县	43.6	40.8	37.6	12.0	13.8	20.1	1.15	1.51	2.28	4511	5850	6790	3467	3936	5100
ad) 安福县	65.3	64.3	57.7	14.5	17.5	26.3	1.44	1.85	2.77	5681	6621	7271	2261	3956	2597
ae) 吉水县	80.8	76.1	69.7	20.4	25.4	37.5	1.81	2.19	4.23	6267	6971	9640	2363	4737	6816
af) 峡江县	39.6	37.1	32.7	5.9	6.9	11.5	0.76	1.07	1.92	3511	5054	6057	3260	4556	4597
ag) 永丰县	59.6	60.2	54.7	15.3	18.4	28.2	1.30	1.79	3.06	3856	6064	6669	1036	3660	4946
ah) 新干县	55.2	49.5	45.1	11.3	14.3	22.5	1.03	1.65	3.44	3539	6114	10080	2651	3774	7641
ai) 赣东市	366.4	325.9	290.5	103.6	116.0	181.6	10.73	12.27	21.64	33625	45262	53183	23294	28548	36476
aj) 南城县	45.9	34.1	29.2	11.6	12.9	20.1	1.52	1.60	2.78	6141	6265	7787	3704	4496	5717
ak) 南丰县	37.8	31.6	29.5	9.6	10.5	18.3	1.22	1.37	2.47	4961	5413	6426	2870	3887	3967
al) 金溪县	46.7	42.9	38.2	9.5	11.4	19.0	1.29	1.47	2.44	5630	5960	7130	4289	4494	4624

[Key to follow]

Table 2-11 (cont.)

续2

县 a) 项 b) 目 别	耕地面积 c) (万亩) 57年	65年	79年	农业人口 d) (万人) 57年	65年	79年	粮食总产量 e) (亿斤) 57年	65年	79年	征购原粮总数 f) (万斤) 57年	65年	79年	纯调出原粮总数 g) (万斤) 57年	65年	79年
am) 崇仁县	48.2	42.6	33.2	13.1	14.6	20.3	1.35	1.50	2.51	4220	5814	6279	1943	3276	3486
an) 乐安县	49.5	44.5	39.5	12.4	14.0	23.3	1.34	1.48	2.70	4590	6260	6826	2751	3063	3927
ao) 宜黄县	34.1	32.4	30.8	8.6	9.1	14.7	0.94	1.01	2.17	3960	4263	5531	2853	2954	3659
ap) 广昌县	25.4	24.1	22.1	9.0	9.6	14.3	0.79	1.02	1.62	2673	3389	4533	1543	1791	3670
aq) 宁都县	78.8	74.7	67.9	29.8	33.9	51.6	2.28	2.82	4.35	6450	7877	8671	3341	4587	7426
ar) 赣西北	250.2	240.3	223.6	98.0	112.8	157.2	9.04	10.50	18.30	31530	32807	42903	25515	20374	25524
as) 奉新县	46.8	46.2	43.2	12.0	14.2	20.1	1.40	1.59	2.96	6301	5949	8793	5577	4386	6291
at) 宜丰县	44.8	41.4	38.5	12.1	13.0	18.3	1.24	1.50	2.64	5553	5913	7100	5933	4074	4343
au) 上高县	46.2	46.7	41.5	14.0	17.2	23.1	1.24	1.93	3.46	4280	6767	9413	3130	6010	5596
av) 万载县	42.8	40.9	40.0	21.4	24.5	33.8	2.20	1.94	3.35	6586	5984	6596	5266	2583	3843
aw) 宜春县	69.6	65.1	60.4	38.5	43.9	61.9	2.96	3.54	5.89	8810	8194	11001	5906	3381	5451
ax) 赣东北	152.9	132.2	123.4	51.9	59.1	89.7	4.99	6.15	9.74	17561	20303	27584	11097	11979	17268
ay) 贵溪县	71.5	58.8	54.1	23.3	24.9	37.3	2.43	2.71	4.02	8486	9704	12771	5730	6659	8203
az) 弋阳县	42.3	37.8	35.2	12.8	16.2	24.7	1.22	1.75	2.97	4101	5469	8023	2640	2973	5559
ba) 铅山县	39.1	35.6	34.1	15.8	18.0	27.7	1.34	1.69	2.75	4974	5130	6790	2727	2347	3506

[Key to follow]

[Key to Table 2-11]

Key:
a) County
b) Particulars
c) Cultivated land area (10,000 mu)
d) Agricultural population (10,000 people)
e) Gross grain output (100 million jin)
f) Total amount of state crude grain procurement (10,000 jin)
g) Total net outshipment of grain (10,000 jin)
h) Total for key counties
i) Percentage for the province as a whole
j) Boyang Lake region
k) Nanchang County
l) Xinjian County
m) Anyi County
n) Gao'an County
o) Fengcheng County
p) Qingjiang County
q) Linchuan County
r) Jinxian County
s) Dongxiang County
t) Yujiang County
u) Boyang County
v) Leping County
w) Source of data: Jiangxi Provincial Agriculture Commission
x) Yugan County
y) Wannian County
z) Jitai Basin
aa) Ji'an County
ab) Taihe County
ac) Wan'an County
ad) Anfu County
ae) Jishui County
af) Xiajiang County
ag) Yongfeng County
ah) Xin'gan County
ai) Gandong County
aj) Nancheng County
ak) Nanfeng County
al) Jinxi County
am) Congren County
an) Le'an County
ao) Yihuang County
ap) Guangchang County
aq) Ningdu County
ar) Northwest Jiangxi
as) Fengxin County
at) Yifeng County
au) Shanggao County
av) Wanzai County
aw) Yichun County
ax) Northeast Jiangxi
ay) Guixi County
az) Yiyang County
ba) Qianshan County

Wheat-early paddy-late paddy three-crop system: This system was newly developed during the 1970's, and it holds fairly great potential for increased grain yields. At the same time it is a farming system that exhausts soil fertility. Experience with it in Pingxiang, Leping, and Ganzhou show that where water and fertilizer conditions are fairly good, fields few and population numerous, and the burden on the labor force light, use of this farming system on some fields can help increase grain yields tremendously. All that is necessary is maintenance of a scientific attitude, understanding and mastery of objective laws as a result of practice, and proper solution to some contradictions that arise in the growing of paddy and wheat in a three-crop system, and increased yields crop after crop are entirely possible. However, in hill regions where fields are numerous relative to population, where water and fertilizer conditions are poor, and where grain yields per mu are low, one should proceed from actual circumstances and generally the three-crop system should not be promoted.

In addition to the foregoing several farming systems, some hill and mountain regions and some plains are lacking adequate water use an early paddy-late soybeans-green manure two-crop system, an early paddy-late sweet potatoes-winter fallow two-crop system, or a late paddy-winter fallow single-crop system. In some cash crop areas, frequently paddy and peanuts, soybeans, cotton, jute and sugarcane are rotated. Practice has demonstrated that rotation between wetland and dryland crops, and interplanting between rows of a standing crop such as interplanting of corn in sweet potato fields, interplanting gaoliang between rows of peanuts, interplanting of soybeans or cotton (as has been done in Jinxian County) between rows of barley or wheat, mixed sowing of Chinese milk vetch and rape, or intercropping of grain in mountain forests (such as the intercropping of sweet potatoes, corn, peanuts, or sesame among young tea oil or tea bushes) are all very good ways of combining soil use with soil nurture. Such methods should be vigorously promoted in the future through the adaptation of general methods to specific circumstances. However, it should be noted that no place or unit should implement just one solitary farming system, but rather should match up various different farming systems so that each has a proper role to play under various conditions for the promotion of balanced increases in yields. Any undiversified and "arbitrarily uniform" way of doing things contravenes both natural laws and economic laws, and is thus bound to fail. Such lessons have been very numerous, and we must note them well.

4. Cash Crop Production and Patterns

Cash crop production is yet another important production sector of the province's farming industry. Kinds of such crops are numerous and their economic value is great, the most important ones being rape, cotton, peanuts, sesame, tobacco, tea and fruit. Quite a few such products, such as honey oranges from Nanfeng, green tea from Wuyuan, black tea from Xiushui and Wuning, tea oil from Yichun, grass linen from Wanzai, Jinxian sesame, Leping pepper, Dongxiang and Xingguo fresh ginger, plus

Guangchang white lotus, and tobacco from Pengze, Boyang, Xinfeng, and Guangfeng are renowned and enjoy a high reputation everywhere. During the national economic recovery and First 5-Year Plan periods, the area sown to cash crops in the province reached about 10 percent of the total area sown to farm crops. During the past 10 years, except for sugarcane and sugar, both area sown and output of numerous cash crops has declined. Hastening the revival and development of cash crop production is a major task in the current building of agricultural production.

表 2—12　　江西省1979年与1957年经济作物播种面积构成比较

年份 a)	总面积 b)	油菜籽 c)		棉花 d)		花生 e)		芝麻 f)		黄麻 g)	
		h) 面积	%	h) 面积	%	h) 面积	%	h) 面积	%	h) 面积	%
1979	707.8	321.1	45.4	152.1	21.5	69.6	9.8	103.9	14.7	7.8	1.1
1957	874.5	514.5	58.8	108.9	12.5	67.7	7.7	135.3	15.5	21.9	2.5

年份 a)	苎麻 i)		烤烟 j)		晒烟 k)		甘蔗 l)		药材 m)		其他 n)	
	h) 面积	%	h) 面积	%	h) 面积	%	h) 面积	%	h) 面积	%	h) 面积	%
1979	2.1	0.3	3.2	0.4	5.7	0.8	28.2	4.0	5.8	0.8	8.3	1.2
1957	7.3	0.8	0.2	0.02	7.4	0.8	8.4	1.0	—	—	2.9	0.3

o) 资料来源：江西省农委

Table 2-12. Comparative Structure of Area Sown to Cash Crops in Jiangxi Province in 1979 Versus 1957

Key:
a) Year
b) Total area
c) Rapeseed
d) Cotton
e) Peanuts
f) Sesame
g) Jute
h) Area
i) Ramie
j) Flue-cured tobacco
k) Sun-cured tobacco
l) Sugarcane
m) Medicinal herbs
n) Other
o) Source of data: Jiangxi Provincial Agriculture Commission

A. Oil-bearing Crops

Oil-bearing crops include rapeseed, peanuts and sesame, which account for approximately 70 percent of the province's area sown to cash crops, rape alone accounting for 45 percent (1979 figure).[5] Clearly, oil-bearing crops are a stapel in the province's cash crop production.

Jiangxi Province has outstanding natural conditions for development of rape production, and numerous places are accustomed to the growing of rape, which has been a major oil-bearing crop for the province over the years. In most years, output of rapeseed oil accounts for approximately 30 percent of the province's total output of fats and oils. Today, about 70 percent of all rape grown in the province is grown on wetlands as a winter crop. The remainder is grown on drylands having rather good soil. Production areas in which growing is fairly concentrated include counties around Boyang Lake, namely Gao'an, Nanchang, Fengcheng, Qingjiang, Xinyu, Yugan, Leping, Duchang, Yongxiu, De'an, Xingzi, Hukou, and Jiujiang, as well as Linchuan and Nancheng counties. Substantial growing is also done in Guangfeng and Yushan counties in northeastern Jiangxi, in Yichun, Shanggao, and Yongxin counties in western Jiangxi, and in Ji'an, Jishui, Taihe, and Anfu counties in the Jitai Basin. Though the province's rapeseed growing area is fairly large, amounting to more than 5.1 million mu in the all-time high year (1957), yields per mu are not high at all. In 1979, yields for the province as a whole averaged only 63 jin per mu, with wide variations from area to area. Highest yields were 120 to 130 jin per mu, and lowest were only 30-odd jin, so a fairly great potential for increased yields exists.

Though rape requires a long growing season, inasmuch as it may be grown during winter when it is able to benefit fully from growth during the winter and spring seasons, it does not compete for land with grain and cotton. In addition, it is a crop that yields both oil and fertilizer. Its seeds have an approximately 40 percent oil content, more than 30 jin of oil being obtained from the pressing of 100 jin of rapeseeds.[6] The dry cake obtained after pressing has a fertilizer value per 100 jin equivalent to 23 jin of ammonium sulfate, 15 jin of calcium superphosphate and 3 jin of potassium sulfate. If the stems, leaves, stalks and flowers of rape are left in the fields, they can enrich soil fertility. The root system secrets an organic acid capable of dissolving mineral potash in the soil. Practice has demonstrated that the rotation of rape with paddy rice or green manure can improve the soil's ventilation, improve soil tilth, increase the soil's organic matter, help increase soil fertility, and promote increased grain and other crop yields. Therefore, the growing of rape can both make good use of the land and

[5] Tea oil trees are economic trees, so they have not been included as oil-bearing crops. However, since the tea oil pressed from tea oil seeds constitutes a major source of fats and oils in the province, it has been appended following oil-bearing crops.

[6] Several major oil-bearing crops converted to percentage of fat and oil: rapeseed, 32; sesame, 47; peanuts, 25; tea oil seeds, 20.

nurture the land well. It is a good one-season crop, and a good source of income, and a good way in which to advance the all-round development of agricultural production. The province currently has 8 million mu of fields that lie fallow during winter, a substantial portion of which might be used for the growing of rape. Potential for development of rape production is very great. Old ideas about "grain and oil are in opposition to each other" must be broken. The party's rural economic policies must be diligently implemented and the enthusiasm of the masses for planting rape must be aroused to the full. It is necessary to suit general methods to specific circumstances to lay out rational crop patterns. In plains areas where population is large relative to farmland, the labor force plentiful, and the climate suitable, every effort is to be made to expand the rape-paddy-paddy farming area and harvest high yields from all three crops. Hill areas, too, can do some three-crop farming using rape-paddy-beans. High and frigid mountain regions can develop two-crop production using rape and paddy. While expanding the rape-growing area as feasible, principal energies should be devoted to increasing yields per unit of area. Attention must be given to planning the successive planting of rape and early paddy crops so as to solve the conflict between grain and rape for the same growing season, the same growing area and the same work forces. It is also important that cabbage-type varieties be selected that are widely adaptable, tolerate fertilizer, resist lodging, are strongly resistant to diseases and insect pests, ripen early and produce high yields, and that the farming system be changed to the growing of seedlings for transplanting, sensible fertilization done and care intensified so as to harvest bumper crops of both grain and rape.

Table 2-13. Area Sown and Output of Rape in 30 Key Counties in Jiangxi Province

Area: 10,000 mu
Gross output: 10,000 dan

表 2—13 b) 江西省30个油菜重点县播种面积和产量

面积：万亩
总产：万担

县 a) 名	一九五二年		c) 一九五七年		d) 一九六五年		e) 一九七九年	
	播面 f)	总产量 g)	播面 f)	总产量 g)	播面 f)	总产量 g)	播面 f)	总产量 g)
h) 重点县合计	223.78	92.64	329.56	73.43	164.31	71.21	205.48	131.26
i) 占全省比重（%）	66.3	65.3	64.1	71.5	61.9	64.7	64.0	65.2
j) 高安	13.39	6.02	18.87	2.45	11.28	4.95	15.75	10.67
k) 新余	11.00	3.31	12.66	2.66	7.37	3.38	7.39	4.65
l) 丰城	2.99	1.10	12.25	3.30	4.29	1.79	7.04	4.07
m) 上高	4.38	2.19	9.48	1.64	5.04	2.50	5.56	3.87
n) 清江	10.36	3.97	8.14	1.37	4.01	1.55	5.03	3.38

[Table continued on following page]

县名	一九五二年 播面	一九五二年 总产量	一九五七年 播面	一九五七年 总产量	一九六五年 播面	一九六五年 总产量	一九七九年 播面	一九七九年 总产量
宜春	5.20	3.12	12.29	3.25	4.22	2.65	3.19	2.94
波阳	20.08	9.04	32.18	6.63	13.34	6.60	20.34	10.53
玉山	7.27	3.10	8.64	2.43	6.02	1.48	3.71	3.66
上饶	10.20	3.35	12.85	3.59	3.93	1.60	3.64	3.08
余干	6.99	2.85	11.44	3.50	1.28	0.48	8.31	5.39
广丰	11.79	2.80	11.15	3.71	3.32	0.96	2.74	2.59
乐平	9.31	4.66	9.49	2.50	4.18	2.32	5.31	4.16
都昌	13.96	7.78	19.00	4.66	12.99	5.85	10.30	7.01
修水	6.20	5.02	8.90	2.54	5.48	3.23	4.19	3.43
湖口	7.69	3.84	12.60	3.94	6.10	4.17	4.69	4.58
武宁	5.20	3.68	7.86	1.63	5.13	2.34	3.98	2.91
永修	6.85	4.79	9.22	2.09	6.45	3.39	7.90	4.70
九江	4.89	3.52	9.07	4.30	4.49	4.31	4.39	4.42
吉安	8.45	0.84	15.59	2.19	8.90	2.19	10.54	4.15
吉水	5.39	0.54	11.00	2.10	7.04	1.81	7.81	3.89
泰和	15.28	1.83	15.05	1.07	7.18	1.55	8.69	3.05
安福	12.01	2.16	11.72	1.81	7.39	1.80	7.96	3.31
永新	0.70	0.28	6.46	1.46	4.47	2.17	5.48	4.61
临川	2.69	0.94	6.48	1.41	7.02	1.46	6.40	3.73
南城	1.67	0.61	3.47	0.32	2.16	0.37	3.11	1.52
南昌	2.28	1.16	5.76	0.62	0.19	0.04	13.57	7.45
新建	5.70	2.60	4.41	0.59	1.77	0.49	6.19	3.78
彭泽	5.99	3.59	10.37	2.76	3.81	2.38	6.04	4.32
瑞昌	2.29	1.40	6.48	1.71	2.23	1.78	3.06	3.07
德安	3.58	2.55	6.71	1.22	3.23	1.62	3.17	2.34

资料来源：江西省农委

[Key for Table 2-13]

Key: a) County
b) 1952
c) 1957
d) 1965
e) 1979
f) Area sown
g) Gross output
h) Key county total
i) Percentage of total for province
j) Gao'an
k) Xinyu
l) Fengcheng
m) Shanggao
n) Qingjiang
p) Yichun
q) Boyang
r) Yushan
s) Shangrao
t) Yugan
u) Guangfeng
v) Leping
w) Duchang
x) Xiushui
y) Hukou
z) Wuning
aa) Yongxiu
ab) Jiujiang
ac) Ji'an
ad) Jishui
ae) Taihe
af) Anfu
ag) Yongxin
ah) Linchuan
ai) Nancheng
aj) Nanchang
ak) Xinjian
al) Pengze
am) Ruichang
an) De'an
ao) Source of data: Jiangxi Provincial Agriculture Commission

Tea oil holds great potential in the province's production of oil-bearing crops, and it is a staple source of oil with broad prospects for development. It is the province's principal woody oil-bearing crop. Tea oil seeds have a 20-35 percent oil outturn rate, and tea oil has a delicate color and fragrance. Its unsaturated fatty acid content is approximately 94 percent, higher than for hebaceous oil-bearing crops like peanut oil and rapeseed oil. It is easily digested and it makes a very fine edible oil. Tea oil plants in their prime that have been meticulously tended

and that have grown well yield between 20 and 30 jin per mu of oil. As much as almost 100 jin has been obtained from high-yield experimental forests. New plantings also grow quickly and produce profusely provided they have been transplanted properly and tended well. Furfural may be extracted from the seed husks, and the seed cake may be used either as fertilizer or for making pesticides. Tea oil shrubs tolerate drought, wetness and poor soil; they are fairly adaptable, and are suited for planting in the province's farflung red earth hill regions, barren mountains and barren slopes. Development of tea oil production causes no conflict with grain for land, time or work forces, and it is possible to sustain balanced high yields from large areas. The peak period of production may be extended to 4o or 50 years. The province's mountain region masses have had a tradition and plentiful experience in the growing of tea oil plants, and tea oil has historically been the main source of edible oil for the province's mountain people. The masses praise it as "a strategic oil depot that cannot be wiped out or bombed to destruction." Since founding of the People's Republic, the province's tea oil production has seen very great revival and development. Today the province has an area of almost 15 million mu in tea oil forests, which is slightly less than for Hunan for second place in the country. Tea oil output is greater in some years than other and fluctuates rather greatly. In normal years, output is around 3 million dan, but during the bumper crop year of 1979, it reached more than 3.83 million dan. Tea oil output amounts roughly to between 40 and 40 percent of the province's gross output of fats and oils (37 percent in 1979). Tea oil forest areas are found virtually everywhere throughout the province. Forty-five counties have more than 100,000 mu of tea oil shrubs, but concentration is greatest in Pingxiang and Yichun counties in western Jiangxi, in Yongfeng, Suichuan, and Xingguo counties in central and southern Jiangxi, in Xiushui and Wuning counties in northwestern Jiangxi, and in Shangrao, Yushan, and Hengfeng counties in northeastern Jiangxi. Becasue of the prolific production of tea soil by Yichun, Suichuan, Yongfeng, and Xingguo, the whole province has been dubbed an "oil depot." Yichun County has a more than 720,000 mu tea oil forest area spread throughout the county on 29 communes (or farms) that normally produce more than 6 million jin of tea oil annually. They sell the state more than 2 million jin annually. In the all-time high year (1958), output reached more than 8.6 million jin, more than 3.8 million jin of which the state purchased. In numerous communes and brigades in the county, income from tea oil amounts to between 30 and 50 percent of total income from agriculture. The main problems currently existing in the provinces tea oil production are as follows: A substantial portion of tea oil forests are old and in deteriorated condition; a welter of varieties is grown, they are subject to numerous diseases and insect pests, and many of them are in a wild or semiwild nonintensively cultivated state. Yields per unit of area are low, amounting to only 20-odd jin of oil per mu of tea oil seeds. Reclamation and development are urgently needed.

Sesame and peanuts also account for a certain percentage of the province's oil-bearing crop production. In 1979, sesame was sown on almost 1.04 million mu and peanuts on 696,000 mu in the province. Sesame is found

mostly south of Boyang Lake and in the province's eastern hill region, particularly in Jinxian and Boyang counties where the area sown totals more than 150,000 mu (1979 figure). Formerly peanuts were grown mostly on the sandy soil along both shores of the Gan River and its tributaries. Since liberation, much development of peanut growing has also been done in the red earth hill regions. The southern Jiangxi region has 38 percent of the total area sown to peanuts in the whole province (1979 figure), and it is one of the region's main cash crops. Gao'an, Xinyu, Shanggao, Qingjiang, and Fengxin counties in Yichun Prefecture also account for a very great percentage of area sown to peanuts.

Oil-bearing crop production holds an important position in the province's agricultural production. In the future, vigorous revival and development of oil-bearing crop production must be taken in hand as a major task in the building of agricultural production. There are still large tracts of barren mountains, hillsides and fields that lie fallow in winter in the province on which oil-bearing crop production may be developed. Full use of these barren mountains, wastelands and fields that lie fallow in winter to expand oil-bearing crop production would not cause competition between grain and oil-bearing crops and would result in the afforestation of mountaintops, conservation of water and soil, regulation of the climate, guaranteeing of bumper agricultural harvests, and the burgeoning of mountain region economies. Therefore, in proceeding from the real situation in the province, simultaneous efforts must be made in the growing of both herbaceous oil-bearing crops and woody oil-bearing crops, with vigorous efforts made to develop woody oil-bearing crop production, gradually taking the path of a conversion to the growing of woody oil-bearing plants for edible oil. This is a measure that bears on the direction that solution to the edible oil problem will take. In addition to the need to continue a firm grip on the revival and renovation of existing tea oil forests in key producing counties, the transformation and tapping of potential and the raising of the scientific level of forest propagation, practice of intensive operations and garden-style care, and promotion of high yields of top quality for places having plentiful barren mountain resources and places having outstanding conditions for development of woody oil-bearing crops, a comprehensive survey of resources and overall planning taking all factors into account should be done following the principle of suiting general methods to specific circumstances for the building of a series of woody oil-bearing crop bases for products such as tea oil. Additionally, places having suitable conditions should bend major efforts to the promotion of an oil-bearing crop-paddy-paddy three-crop system. They should pay strict attention to the experiences of Nanchang, Xinjian, Yongxiu, Gao'an, Fengxin Fengcheng, Linchuan, Jinxian, and Dongxiang counties, which have built more than 1 million mu of tea oil bases so as to increase the province's oil-bearing crop output as quickly as possible to meet needs both inside and outside the province.

B. Cotton

Cotton is a major cash crop for the province with a growing area second only to that for oil-bearing crops. In 1979, the area sown amounted to 21 percent of the province's total cash-crop-growing area.

Cotton was originally a subtropical crop. It likes warmth, light and short hours of sunlight over a long growing season. Its seeds require a temperature above 10°C in order to germinate. When temperature is below 40°C, as temperature rises, growth accelerates. The suitable temperature for blossoming is above 25°C, and a temperature above 20°C is required for formation of cotton fiber. In most parts of the province, temperatures return to above 12°C during early to mid-April, which is the proper time for sowing cotton. By May, they have climbed to above 20°C, and during July, they are above 26°C, all of which are suitable for cotton's growth and development. The first frost late in the season also occurs later than in north China cotton-growing areas, and this helps maturation of the cotton fibers. Cotton growth and development is extraordinarily sensitive to light conditions. Sunlight is ample in Jiangxi Province from May to October, favoring cotton growth. The taproot of cotton goes deep, and side roots are well developed, making cotton tolerant of drought. However, Jiangxi Province receives copious rainfall. In fact, during spring, rainfall is continuous, requiring the digging of deep ditches to drain away water. During summer and autumn, drought occurs, necessitating watering of crops to withstand drought. Since cotton is a crop with deep roots and that also requires regular cultivation, it needs a deep soil layer that is loose and drains well. The alluvial soil found in Jiangxi Province along the Yangtze River and on the shores of several main rivers provides excellent soil conditions for the growing of cotton. Nevertheless, up until liberation, extremely little cotton was grown in the province, with cottonfield area for the whole province totaling only about 300,000 mu (and 304,000 mu was the record high before the War of Resistance to Japan). In addition, an overwhelming majority of the cotton produced was low-yield, poor-quality, coarse-fiber cotton. Only in Pengze, Yongxiu, Xingzi, Jiujiang, and Leping counties was a small amount of retrograde "foreign cotton" (green-seed Tuozi cotton) and experimental Dezi and Daizi cotton grown. Maximum ginned cotton output for the whole province in 1937 was only 83,300 dan (including the output of several tens of thousands of mu of cottonfields on the north shore of the Yangtze River in Jiujiang County, which have been made a part of Huangmei County in Hubei Province). As of the eve of liberation, only 30,000-odd mu were grown. Not only were there only very small cotton textile mills in the province, but the cotton they used was imported. Thus, shipments from other provinces had to be relied upon even for the cotton wadding that the people needed in their daily lives.

After liberation, both the party and government showed extreme concern for the two important matters of food and clothing for the people, and they devoted extremely serious attention to development of cotton production. In 1950, they began test plantings of small amounts of imported

varieties, which led to a series of measures for fairly large-scale development of cotton production. First, Daizi No 14 improved variety was introduced from Jiangsu and Shanghai into Pengze, Jiujiang, Hukou, Yongxiu, and Anyi counties where it was bred and spread. Agricultural authorities also set up ginning mills for superior-variety cotton and they developed a full understanding of high-yield, outstanding-quality superior varieties, hastened their spread, and insured purity of cotton species with the result that the province's cotton production developed rapidly and the growing of cotton spread quickly throughout the province from south to north. As of 1952, the province's cottonfield area had increased to 890,000 mu. This included more than 600,000 mu of fine-fiber cotton. The province's gross output of ginned cotton totaled 272,000 dan. Later on, measures were adopted including a policy of providing bonuses for cotton production, and then cotton production developed further. By 1965, the province's cotton growing area had expanded to more than 1.64 million mu, a more than 10-fold increase since 1949, and ginned cotton output had increased more than 28-fold. This was an average annual 25.7 percent incremental increase, which greatly outstripped the average national 10.1 percent increase in cotton output for the same period. As compared with eight cotton-growing provinces in the Yangtze Basin, Jiangxi Province ranked first in speed of increase in output.

Though cotton can be grown anywhere in the province from north to south, as a result of natural and socioeconomic conditions, most of the major cotton-growing areas are concentrated in northern and central Jiangxi. They may be divided into three principal cotton-production areas, namely:

1. North Jiangxi cotton growing region. This includes Pengze, Duchang, Hukou, Ruichang, and Jiujiang counties along the shores of the Yangtze and in the Xiushui River Basin, where the cotton-field area is not only large but also fairly concentrated. Fairly concentrated commune and brigade cottonfield areas account for about 50 to 60 percent or more of the cultivated land area. These five counties account for about 90 percent of both the cottonfield area and the output of Jiujiang Prefecture, and they are the province's major concentrated cotton-growing region.

2. Central Jiangxi cotton-growing region. This includes mostly the middle and lower reaches of the Gan River as well as its tributary, the Yuan River, plus Xinyu, Gao'an, and Qingjiang counties along the Jan River, and Linchuan, Chongren, and Jinxian counties in the middle and lower reaches of the Fu River, most of which are cotton-growing regions that have come into being since liberation. Cottonfields here are more scattered than in the north Jiangxi cotton growing region, and yields per unit of area are likewise not as high as in north Jiangxi.

3. Northeast Jiangxi cotton-growing region. This includes mostly Boyang, Leping, Yugan, and Wannian counties. This is a cotton-growing region that was newly opened following successful test planting experiments in the red earth hills following liberation. Cottonfields are fairly concentrated, and yields are second only to those of the north Jiangxi cotton-growing region.

In terms of regional distribution, currently most of the province's cottonfields are found in 20-odd counties. In 1979, the cotton-growing area was more than 30,000 mu and was located in 16 of the province's counties. The area planted to cotton in these 16 kay cotton counties amounted to 83 percent of the province's total cotton-growing area, and they produced 87 percent of the province's total cotton output and quantity sold to the state (See Table 2-17). Most of these key cotton-growing counties also neighbor each other, forming a continuous tract and setting the stage for the regionalization and specialization of the cotton-producing region.

Major problems existing in the province's production at the present time are as follows: As a result of proportional imbalances within agriculture, a mistaken one-sided notion exists in some places that "attention to agriculture means attention to grain," with the result that cottonfield distribution is still not rational. On the one hand, some places contravene natural laws in their pursuit of grain output. They do not scruple to convert fine cottonfields to grain production, but convert to the growing of cotton only scattered, distant, infertile fields lacking irrigation facilities, and in some places a situation exists whereby cotton growing is relegated to the mountains or to flats along rivers. This plus the nonintensive care given usually means a harvest is taken from these fields when they have one, and a dead loss results when they do not have one. On the other hand, an extremely few places ill-advisedly overconcentrate the growing of cotton as a result of "work pressure," so crops are not equitably rotated on cottonfields, and yields per mu cannot be increased very much. In addition, the overconcentration of farm work in certain seasons and the shortage of labor causes a great many contradictions. In addition, costs in the growing of cotton are high; many workers are employed, and prices paid are low, so earnings are less than from the growing of grain and other crops. Grain rations for cotton-growing areas are also relatively low. This has resulted in the local masses not wanting to grow cotton. For these reasons, during the past 10-odd years, no expansion of the province's cottonfield area has been possible, nor has it been possible to increase output. Development of cotton production has fluctuated back and forth without moving forward, with serious consequences for development of the light textile industry and the national economy. There are eight cotton textile plants in the province with a 330,000-spindle capacity. Were all used to the full, they would require more than 1.2 million dan of cotton annually. But current cotton output in the province is only slightly more than 800,000 dan for a self-sufficiency rate that is only a little better than 60 percent, and if civilian needs for cotton plus the needs of medicine and sanitation are taken into account, the level of self-sufficiency is even lower. Consequently, the earliest possible upturn in the province's cotton output constitutes an extremely urgent task in future building of agricultural production.

表2—17　　江西省16个重点产棉县棉花生产和收购情况

a) 县名	b) 植棉面积(万亩) 1965年	1979年	c) 亩产(斤) 1965年	1979年	d) 总产(万担) 1965年	1979年	e) 收购量(万担) 1965年	1979年	f) 人平提供商品棉(斤) 1965年	1979年
g 重点县合计	122.22	123.83	68	61	83.88	75.69	78.61	74.71	18.9	9.5
h 占全省比重(%)	74.5	83.1	—	—	87.9	86.9	76.5	86.9	—	—
i 彭泽	14.00	14.62	108	114	15.15	16.65	15.05	16.84	86.1	66.6
j 九江	9.19	8.84	91	103	8.34	9.06	7.85	8.76	37.1	37.7
k 都昌	7.95	9.34	71	56	5.66	5.26	5.15	5.18	14.8	10.6
l 湖口	7.59	7.25	56	67	4.28	4.85	4.25	4.86	30.1	25.1
m 瑞昌	7.01	6.32	81	93	5.67	5.91	6.16	5.74	32.0	20.8
n 新余	10.89	12.15	68	66	7.46	7.98	7.01	7.83	22.1	16.9
o 靖安	8.63	9.68	50	49	4.34	4.78	3.54	4.39	8.9	8.0
p 丰城	7.31	9.04	47	35	3.42	3.23	2.94	3.13	5.0	3.6
q 清江	4.29	3.52	55	37	2.35	1.30	2.23	1.28	8.7	3.4
r 南昌	2.32	2.99	52	48	1.22	1.43	—	1.39	—	1.7
s 波阳	11.71	9.39	68	43	8.00	4.06	8.00	4.21	12.6	4.4
t 乐平	8.12	7.25	66	46	5.36	3.36	5.70	3.46	17.2	6.9
u 余干	7.28	4.33	54	24	3.91	1.07	3.43	0.85	9.0	1.5
v 万年	1.32	4.76	54	37	0.71	1.77	—	1.76	—	7.1
w 临川	7.14	6.65	54	30	3.89	1.98	3.37	1.99	7.4	3.4
x 进贤	7.47	7.70	55	39	4.12	3.00	3.93	3.04	14.5	5.9

y) 资料来源：江西省农委

z) 注：① 1965年收购量缺南昌、万年两县的数字，故占全省的比重只有76.5%，如加上这两个县的收购量，则占的比重亦可能超过85%

② 1965年人平贡献数也未包括两县在内平均计算的。

Table 2-17　Status of Cotton Production and State Procurement in 16 Key Cotton-Producing Counties of Jiangxi Province

Key: a) County
b) Cotton-growing area (10,000 mu)
c) Yields per mu (jin)
d) Gross output (10,000 dan)

[Key continued from previous page]

e) Quantity procured by state (10,000 dan)
f) Average amount of marketable cotton provided (jin)
g) Total for key counties
h) Percentage of province total
i) Pengze
j) Jiujiang
k) Duchang
l) Hukou
m) Ruichang
n) Xinyu
o) Gao'an
p) Fengcheng
q) Qingjiang
r) Nanchang
s) Boyang
t) Leping
u) Yugan
v) Wannian
w) Linchuan
x) Jinxian
y) Source of data: Jiangxi Provincial Agriculture Commission
z) Note: (1) Figures are lacking for 1965 state procurement from Nanchang and Wannian counties; thus, the percentage of province total is only 76.5 percent. Were the amount of procurement for these two counties to be added, possibly the percentage would be more than 85 percent.
(2) Average contribution figures for 1965 have also been figured on average without including these two counties.

Pursuit of a policy of suiting general methods to specific circumstances and suitable concentration, and taking into consideration the overall situation in agricultural production in terms of natural and economic conditions as well as the existing foundation throughout the province, future cotton production in the province over the short-term should aim mostly at increasing yields per unit of area. Places having requisite conditions should simultaneously expand the growing area. The orientation of development should be as follows: active consolidation and upgrading of the northern Jiangxi cotton-growing area, vigorous tapping of potential for increased yields, appropriate expansion of growing, and tackling yields per unit of area, thereby reviving and surpassing as quickly as possible the all-time highs in both the area sown and yields per unit of area; development of plains and hill region cotton-growing areas around Boyang Lake and in the lower reaches of the five rivers, good performance in the capital construction of farmland water conservancy, expansion of the growing area, crop rotation between wetlands and drylands, and increase in per unit of area yields; stabilization of the present cotton-growing area in central Jiangxi, and vigorous efforts to increase yields per unit of area. As for existing cottonfields in the

southern Jiangsu region, by suiting general methods to specific circumstances, a gradual change can be effected in the growing of other cash crops.

C. Jute and Ramie

Jute: Jute likes high temperatures and much moisture, so Jiangxi Province has conditions favoring the growing of jute. Its fibers are fairly long, and its elasticity and tensile strength are slight. It is highly absorbent and easy to weave, making it a fine raw material for the weaving of gunny sacks. It may also be used to make rope, canvas, fish nets and water-resistant cloth. Up until the time of liberation, the province grew very little jute. After liberation, growing developed and expanded gradua-ly until today when it is one of the province's principal cash crops. Production areas are found mostly on drylands along rivers and in hill region wetlands, a substantial amount being grown in Yujiang, Jishui, Yongfeng, Jinxi, Boyang, Nankang, Ganxian, Xinfeng, and Shangyou counties. Current major problems are as follows: Reduction in the growing area and yields per mu that are not high. In 1952, the area sown to jute in the province reached 187,000 mu, and gross output reached 593,000 dan. By 1979, the growing area had declined to only 78,000 mu and gross output to 301,000 dan, which was far from being able to meet the needs of the province's jute textile industry for development. It will be necessary in the future to implement policies diligently to solve the conflict between grain and jute in a satisfactory manner, to enlarge the jute-growing area, to improve care, to increase yields per unit of area, and to hasten revival and development.

Table 2-18. Area Sown and Output of 17 Key Jute-Growing Counties in Jiangxi Province

Area: Shimu
Gross output: Shidan

表2—18 江西省17个黄麻重点县播种面积和产量

面积：市亩
总产：市担

县 a) 名	一九五二年 b)		一九五七年 c)		一九六五年 d)		一九七九年 e)	
	播种面积 f)	总产量 g)	播种面积 f)	总产量 g)	播种面积 f)	总产量 g)	播种面积 f)	总产量 g)
h) 重点县合计	135693	442884	181035	407201	66614	130245	68452	279109
i) 占全省比重(%)	72.6	74.7	82.6	86.3	86.5	88.6	88.4	92.7
j) 吉水	31115	87123	30000	60000	20720	28992	8817	20323
k) 吉安	9810	37278	18313	35308	1517	1523	718	1087
l) 永丰	8459	21147	6869	11883	7238	10762	6130	22500
m) 广丰	11341	45758	11000	40039	6263	18941	3597	13607

[Table 2-18 continued]

	县名 a)	一九五二年 b)		一九五七年 c)		一九六五年 d)		一九七九年 e)	
		播种面积 f)	总产量 g)	播种面积 f)	总产量 g)	播总面积 f)	总产量 g)	播种面积 f)	总产量 g)
n)	余江	2996	8143	4798	17499	8861	21515	17627	86415
o)	上饶	7090	27433	3644	13552	2623	6064	2913	8524
p)	波阳	26203	94456	27359	83504	2114	5054	5366	27181
q)	乐平	5263	15789	20438	54063	650	1560	562	1215
r)	金溪	166	125	54	50	61	66	6847	43300
s)	临川	3390	10170	1644	5262	1923	3772	2192	3032
t)	南康	11605	44012	27279	86381	4129	11401	4262	20097
u)	赣县	5243	19923	10750	40850	3007	6887	3176	10087
v)	上犹	1246	4149	5067	15531	3924	7800	1208	4547
w)	宁都	5324	11713	2169	5055	385	607	1049	2440
x)	于都	2290	4137	5624	15073	1214	1940	764	1671
y)	信丰	4017	11209	5978	13027	1874	3189	2010	8750
z)	赣州市	135	319	49	124	111	272	1214	4333

aa)资料来源：江西省农委

Key:
a) County
b) 1952
c) 1957
d) 1965
e) 1979
f) Area sown
g) Gross output
h) Key county total
i) Percentage of province total
j) Jishui
k) Ji'an
l) Yongfeng
m) Guangfeng
n) Yujiang
o) Shangrao
p) Boyang
q) Leping
r) Jinxi
s) Linchuan
t) Nankang
u) Ganxian
v) Shangyou
w) Ningdu
x) Yudu
y) Xinfeng
z) Ganzhou City
aa) Source of data: Jiangxi Provincial Agriculture Commission

Ramie: Ramie is a cash crop that very much merits promotion. The growing of ramie takes little labor, costs are low and income is high. One planting will normally last for from 20 to 30 years, and it can be harvested three times each year. Annual ramie yields run generally between 150 and 160 jin per mu; its fiber is long and elegant, and it is the champion among hemp fibers in tensile strength, which is eight to nine times greater than cotton. After absorbing moisture, the fibers increase in strength. They also stand up against rotting and are mold resistant, and are suitable for the weaving of all sorts of cloth as well the making of rope, fishnets and cloth to cover airplane wings. Following denaturation processing, the fibers soften and binding strength and count increase. When woven together with cotton, wool, silk and chemical fibers, it can be made up into all kinds of high-quality appreal. When woven together with polyester fiber, it produces "ramie polyester," which is used as a raw material for textile, rubber, mining and national defense industries as well as an important material for use in the people's daily lives, for marine navigation and for export.

The province has a long history in the growing of ramie of outstanding quality. The grass linen made from tracts of ramie in Yichuan and Wanzai counties is just as famous as Liuyang grass linen from Hunan Province. The province's all-time high ramie output was more than 140,000 dan (1936). Today annual output is only 24,000 dan (1979). Production is concentrated particularly in Ruichang, Duchang and Jiujiang counties in northern Jiangxi, which account for almost 50 percent of the province's total growing area. Second comes Fenyi and Yichun counties. Ramie production in the traditional areas of Wanzai and Yihuang counties is virtually on the brink of extinction. Ramie is a traditional cash crop in Jiangxi Province of national importance and local character to which serious attention should be given in the future and for which revival and development measures should be adopted as quickly as possible on the basis of national needs and capabilities.

D. Sugarcane

Sugarcane originally grew in the tropics, and is a heat-loving, light-loving, water0loving, and fertilizer-loving high-yield sugar crop. During its growth process, it requires a biological lower limit temperature of 13°C, and the most suitable temperature is around 30°C. Light intensity directly affects the speed and amount of sugarcane tillering as well as the number of canes and sugar content. It also requires a relatively wet environment, particularly during its vigorous growth period (i.e., its lengthening period), when it absorbs large quantities of water amounting to between 50 and 60 percent of its total water intake. Additionally, under ordinary production conditions, it absorbs between 20 and 30 jin of nitrate (the equivalent of between 100 and 150 jin of ammonium sulfate) per 5 tons of sugarcane, between 14 and 18 jin of phosphate (the equivalent of between 80 and 107 jin of calcium superphosphate), and between 20 and 30 jin of potash (the equivalent of 42-63 jin of potassium sulfate or 400-600 jin of wood ashes). It also consumes a fairly large quantity of farm labor and requires a corresponding sugar-crushing industry and transportation facilities.

Table 2-19. Area Sown and Output of 13 Kay Ramie-Producing Counties in Jiangxi Province

Area: Shimu
Gross output: Shidan

表 2—19 江西省13个苎麻重点县播种面积和产量

面积：市亩
总产：市担

县 a) 名	一九五二年 b)		一九五七年 c)		一九六五年 d)		一九七九年 e)	
	播种面积 f)	总产量 g)	播种面积 f)	总产量 g)	播种面积 f)	总产量 g)	播种面积 f)	总产量 g)
h)重点县合计	30869	24358	51326	53945	28736	30436	17021	20268
i)占全省比重(%)	56.4	52.2	69.9	76.1	66.7	76.0	80.2	83.6
瑞 j) 昌	4541	4541	16344	20619	7400	11176	6262	8393
都 k) 昌	5397	5936	6206	5634	4323	3356	2610	2807
武 l) 宁	1096	1315	2774	2830	1311	1539	596	594
修 m) 水	1215	365	1500	1625	690	557	381	314
九 n) 江	—	—	1548	2023	892	1339	1417	2132
宜 o) 春	3656	2648	4778	4577	3589	2579	1705	1738
分 p) 宜	4000	2000	5529	5289	4012	4123	2200	2093
上 q) 高	4422	2530	3058	2857	2402	1854	480	411
万 r) 载	2310	1286	3796	3778	1402	937	144	163
宜 s) 黄	1224	979	2000	1000	176	64	141	82
吉 t) 水	1242	869	1314	1042	626	478	266	160
波 u) 阳	1081	1459	1214	1767	468	714	498	963
广 v) 丰	685	430	1265	904	1445	1720	321	418

w) 资料来源：江西省农委

Key:
- a) County
- b) 1952
- c) 1957
- d) 1965
- e) 1979
- f) Area sown
- g) Gross output
- h) Key county total

[Key to Table 2-19, continued]

i) Percentage of province total
j) Ruichang
k) Duchang
l) Wuning
m) Xiushui
n) Jiujiang
o) Yichun
p) Fenyi
q) Shanggao
r) Wanzai
s) Yihuang
t) Jishui
u) Boyang
v) Guangfeng
w) Source of data: Jiangxi Provincial Agriculture Commission

Located in the subtropics, Jiangxi Province is rather conspicuously affected by subtropical high pressure, which makes its climate hot and wet. The province is second only to Taiwan, Fujian and Guangdong among south China's provinces and regions in terms of the quantity of heat. Rainfall is copious, and soil suitable for the growing of sugarcane is found on alluvial plains along all large rivers. The soil layer in such places is thick, friable, and contains just the right amounts of clay and sand (and has a neutral pH for the most part). Its organic content is 2 to 3 percent, and it also contains plentiful phosphate and potash. Natural conditions are rather favorable for development of sugarcane production. Southern and central areas of Jiangxi Province were already growing sugarcane prior to 1500 AD during the Epoch of Division Between North and South. By the middle of the Yuan Dynasty, its growing had spread to the Dongxiang-Yushan area of northeastern Jiangxi. During the Ming and the Qing, the growing of sugarcane everywhere in the province was even more widespread. From its foundation in the growing of sugarcane, the province's sugar-refining industry was already developed during the Ming and Qing period. Records show that in 1912, not only south and central Jiangxi, but places in northeastern Jiangxi as well such as Yujiang, Wannian, Leping, Guixi, Yiyang, Shangrao, Guangfeng, Dongxiang, and Yushan, plus Linchuan and Shanggao counties were growing sugarcane on a certain area. In some counties, annual output of sugar had reached more than 8,000 dan. Prior to the War of Resistance Against Japan, the sugarcane growing area reached a maximum 386,000 mu and produced 45,000 tons of sugar (1936). During the War of Resistance, sugar refining in southern Jiangxi saw even greater development as a result of the frequent depredation of the country's major southern areas producing cane sugar. For a time Jiangxi Province's sugarcane area expanded to more than 200,000 mu, and there were more than 70 native sugar-processing workshops in Tangjiang Town in Nankang County alone. There were numerous famed native sugar varieties including snow race, snowflake, cloth tip and flake sugar, which were sold widely north and south of the Yangtze and enjoyed something of a reputation in markets. Subsequently, as a result of the

oppressive rule of the three great mountains of imperialism, feudalism and bureaucratic capitalism, the province's sugarcane production and sugar-refining industry gradually deteriorated. By the eve of liberation, the only 191,000 mu remained of the province's sugarcane-growing area; sugarcane yields were 1,863 jin per mu, and gross output was only 177,500 tons.

Vigorous efforts at revival and expansion following liberation made the province into one of the nine sugar-producing provinces (or regions) in south China that it is today. In 1979, the province's sugarcane-growing area totaled 282,000 mu, and gross output was 791,000 tons. Since 1957, a series of machine-equipped sugar refineries have been newly built, one after an other, in south, central and northeast Jiangxi, thereby bringing to a close a 1,000-year history of refining sugar by native methods. Today the province's output of machine-refined sugar stands at more than 59,700 tons (1979) a more than 180-fold increase over the period immediately following liberation. The province's cane fields are concentrated mostly in south and central prefectures of the province south of 27 degrees north latitude, where the cane field area accounts for more than 70 percent of all cane fields in the province and produces more than 80 percent of the province's total sugar output. (See Table 2-20)

Table 2-20. Area Sown and Output of Seven Key Sugarcane Counties in Jiangxi Province

Area: Shimu
Output: 10,000 dan

表2—20 江西省7个甘蔗重点县播种面积和产量

面积：市亩
e) 总产：万担

县 a) 名	b) 一九五二年		c) 一九五七年		d) 一九六五年		e) 一九七九年	
	播种面积 f)	总产量 g)	播种面积 f)	总产量 g)	播种面积 f)	总产量 g)	播种面积	总产量 g)
h) 重点县合计	46370	221.54	40292	231.99	108812	677.79	183004	1148.00
i) 占全省比重(%)	41.8	49.3	48.0	57.5	67.2	77.0	64.9	72.6
j) 南康	25753	124.74	25108	150.65	41125	328.35	57158	389.27
k) 赣县	6655	34.79	6696	43.52	28310	160.48	33137	189.22
l) 瑞金	1287	4.50	941	3.95	9444	54.52	18586	138.17
m) 兴国	2156	7.00	1195	5.26	1546	7.08	17963	106.89
n) 泰和	2756	13.27	2542	8.46	10016	37.79	22401	117.26
o) 东乡	6330	33.43	3110	18.37	8225	41.77	16515	100.64
p) 玉山	1433	3.81	700	1.78	10146	47.80	17244	106.55

q) 资料来源：江西省农委

[Key to Table 2-20 from previous page]

Key:
a) County
b) 1952
c) 1957
d) 1965
e) 1979
f) Area sown
g) Gross output
h) Key county total
i) Percentage of province total
j) Nankang
k) Ganxian
l) Ruijin
m) Xingguo
n) Taihe
o) Dongxiang
p) Yushan
q) Source of data: Jiangxi Provincial Agriculture Commission

The entire province has been divided roughly into three cane regions as follows:

1. South Jiangxi cane region including Nankang, Ganxian, Ruijin, Xingguo, Yudu, and Ningdu counties, and Ganzhou City. Climatic conditions are good in these places, which also have a long history of cane growing. This region also leads the province in cane crushing and processing facilities. It is the major cane producing region in the province.

2. Central Jiangxi cane region including Taihe and Jishui counties in which natural conditions are similar to those of the south Jiangxi cane region. The population here is small relative to available land, and competition between grain and sugarcane growing for the labor force is fairly keen. Currently, sugarcane production remains in a stable and unrising state. Inasmuch as soil resources are plentiful in this region, and both the grain self-sufficiency rate and commodity rate are high, potential for future increases in cane production is considerable.

3. North Jiangxi cane region including Dongxiang, Yushan, Boyang, Leping and Yongxiu counties. This region's geographic position is a little far north; its frost-free period is relatively short; it gets a relatively large amount of frost and snow in winter, and its cane-growing season is about 2 months shorter than in south Jiangxi and central Jiangxi cane-growing regions. It is characterized by insufficient development of a sugar-refining industry. Except for Yushan and Dongxiang counties, which are fairly concentrated cane producing areas, the other growing areas are spread out and grow cane for self-sufficiency only. Canefields are scattered, and farming is nonintensive.

Since temperatures are low during winter in the province and since sugarcane is prone to freeze damage, cane is grown mostly in spring and rarely from perennial roots. For the most part, varieties are late maturing ones low in sugar, so the sugarcane commodity rate is relatively low, the sugar content being only 10.39 percent.

The province's sugarcane yields per mu remain relatively low. In 1979, yields averaged 2.8 tons per mu. A look at all cane growing areas shows yields in the highest communes and brigades to be more than 5 tons per mu, while they are only about 1 ton per mu from low-yield ones. Clearly the potential for increased yields is very great.

It should be pointed out that sugarcane has been a cash crop for which revival and development of production has been rapid. Today, it is substantially possible to satisfy needs for development of the province's cane-crushing industry. The province currently has machine refining equipment with capacity to handle 6,650 tons of cane daily. Figuring a 100-day crushing season, only 665,000 tons of cane is needed to satisfy this capacity. With rational planning of cane field distribution, and proper solution to transportation problems during the crushing season, the province's existing cane output can satisfy needs. It must be realized, however, that as compared with other cane-growing provinces of south China, development of the province's sugar crops cannot be considered fast. In 1979, an average 7.2 jin of sugar per capita was consumed nationally, while in Jiangxi Province, average consumption of sugar was less than 4 jin per capita if figured on the basis of the province's output and machine refining of sugar. Very great efforts will continue to be required in order to realize self-sufficiency in sugar in the province. If people's needs for sugar in all the province's cities and rural areas are to be satisfied and commune and brigade cash income is to increase, further efforts in sugarcane production will have to be made in the future. In accordance with the principles of suiting general methods to specific circumstances and rational crop patterns, main efforts should be directed toward development of old cane-growing regions in south and central Jiangxi that have a long history of growing cane, and that have plentiful experience and relatively good conditions for growing it in suitable expansion of the growing area and energetic increase in yields per unit of area. In north Jiangxi cane-growing areas, the emphasis should be on improving varieties to raise yields per unit of area and sugar content. It is necessary to change away from the present farming methods of sole rotation of crops between paddy and sugarcane or the continuous cropping of sugarcane, which seriously deplete soil fertility, to the promotion of effective rotation between wetlands and drylands for the scientific growing of cane. In south and central Jiangxi cane-growing areas, cane may be grown for 2 years followed by peanuts (or some other cash crop, such as sesame) for 1 year, and paddy for 1 year in a system of wetland and dryland rotation over a period of 4 years. Alternatively, cane may be grown for 3 years followed by 1 year of peanuts and 1 year of paddy in a 5-year periodic system of wetlands and drylands crop rotation. In addition, the relatively large space left in the cane fields during the early stage may be used for the

intercropping of beans, rape and green manure crops, the cane being the primary crop and the green manure helping the cane alone for increase in the soil-utilization rate and to increase output of the sugarcane and other crops. In addition, active use should be made of the province's outstanding light and heat conditions, for vigorous development particularly in the southern and central cane-growing regions of the province of high-yield, early-maturing, high-sugar-content autumn-grown sugarcane[7] in order to make the most of sugarcane's bumper yield potential to obtain high sugarcane yields.

E. Tobacco

The province produces both sun-cured and flue-cured tobacco. It has a long history of growing sun-cured tobacco, and it grows numerous varieties of it, including the red sun-cured tobacco of Guangfeng County in northeastern Jiangxi, "old purplish red," which is purplish red in color, oil, and shiny, with thick and richly aromatic leaves; yellow tobacco (sun-cured tobacco) produced in Xinfeng County in southern Jiangxi, which is yellow in color, has a delicate fragrance and is mild, and is an aromatic tobacco for making high-quality cigarettes; the famous "black tiger" sun-cured tobacco produced in Guangchang, the shredded tobacco of Lichuan, and the specially produced coiled tobacco shreds from Boyang, all of which are tobacco products that enjoy a fine reputation in China. Flue-cured tobaccos were largely developed following liberation during the 1960's. The flue-cured tobacco produced in Ruijin County in southern Jiangxi has both a fine color and aroma, and has been rather well accepted.

Outstanding features of tobacco production in the province following liberation have been a great contraction in the area growing sun-cured tobacco, and a gradual expansion of that growing flue-cured tobacco. During the early 1950's, the area of the province sown to sun-cured tobacco amounted to more than 95 percent of both the total growing area tobacco and total tobacco output. Subsequently, with development of the cigarette manufacturing industry, the percentage of flue-cured tobacco production climbed steadily.

The area growing flue-cured tobacco is concentrated in southern Jiangxi where the area sown amounts to 86 percent of the total area sown to flue-cured tobacco in the whole province, and which produces almost 90

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7 Autumn-grown sugarcane: Planted in the fall, it grows during the early season for a shortening of the time required for the seedling stage, enabling it to make full use of sultry summer weather and extending the effective elongation stage. This help make full use of nature to tap the potential for bumper yields, producing a 20 to 30 percent greater yield than from spring-grown cane, or even more than double the yield. It also advances maturation by from 10 to 15 days and increases sugar content by about 1.5 percent, thus using potential to the full for cane yields of 1 ton per mu. It may also be intercropped with late sweet potatoes, late soybeans, late paddy and winter crops to promote full use of the soil and to tap soil potential for increased yields.

percent of all the province's flue-cured tobacco (1979). Xinfeng, Ruijin, Huichang, and Ganxian are the largest producing counties. In addition, the output of flue-cured tobacco from counties like Gao'an in Yichun Prefecture also shows great prospects. The major areas producing sun-cured tobacco are also in southern Jiangxi where the area sown is more than 35 percent of the total for the province, principally in Guangchang, Shicheng, Ningdu and Anyuan counties. Second comes Guangfeng and Shangrao counties in Shangrao Prefecture, and Yichun County in Yichun Prefecture.

Table 2-21. Area Sown and Output of Flue-Cured Tobacco in Four Key Counties of Jiangxi Province

Area: Shimu
Gross output: Shidan

表 2—21 江西省4个烤烟重点县播种面积和产量

面积：市亩
总产：市担

县 a) 名	b) 一九五七年		c) 一九六〇年		d) 一九六五年		e) 一九七九年	
	f) 播种面积	g) 总产量	播种面积	总产量	播种面积	总产量	播种面积	总产量
h) 重点县合计	1387	1613	10828	7859	25265	36367	19908	22605
i) 占全省比重 (%)	69.4	53.8	43.0	46.5	84.0	82.7	62.7	65.5
j) 信丰	1200	1220	3655	2198	15191	21449	11665	11391
k) 瑞金	187	393	3250	2619	3040	4407	3932	4704
l) 会昌	—	—	1829	837	2835	2952	2738	5238
m) 高安	—	—	2094	2205	4199	7559	1573	1272

n) 资料来源：江西省农委

Key:
- a) County
- b) 1957
- c) 1960
- d) 1965
- e) 1979
- f) Area sown
- g) Gross output
- h) Key county total
- i) Percent of whole province
- j) Xinfeng
- k) Ruijin
- l) Huichang
- m) Gao'an
- n) Source of data: Jiangxi Province Agriculture Commission

The province's tobacco production, particularly production of flue-cured tobacco, still required major efforts for revival and development. The province now has two cigarette plants with a designed annual capacity of 180,000 cases of cigarettes. Figuring 60 kg of tobacco per case, a total of 220,000 tobacco is needed annually. Province output, however, is still at less than one fifth of self-sufficiency. If calculations are made at the actual need within the province for the sale of 300,000 cases, it would take 360,000 dan of tobacco leaf just to reach basic self-sufficiency. In order to develop tobacco, which traditionally has been produced as a cash crop in this area, to satisfy needs of the national economy and the daily life of the people, it will be necessary further to implement pertinent policies in the future, make rational readjustments in crop patterns, plant tobacco scientifically and do everything possible to increase the province's tobacco production.

F. Tea, Fruit and Mulberry

Tea: Tea, coffee and cocoa are the world's three major beverages. Tea shrubs originally grew under forest trees in China's southern subtropics. They like warmth, moisture and acidity, and they tolerate the sun. Tea is a neutral plant that favors shade. It can grow and develop in shade, or it can adapt to full sunlight. For germination and growth, it requires daily temperatures averaging more than 10°C. When average daily temperatures are between 15° and 20°C, tea shrubs grow profusely; tea output is high, and quality is good. When sunlight is insufficient or too strong, and not suitable for tea growth, and particularly when infrared rays in direct sunlight are rather strong, the tough fibrous leaves among bud leaves increase, their special tendernesses deteriorates, and quality declines; thus, tea is best grown in fairly weak scattered light (including diffused light), and this helps improve tea quality. Since moisture has a great effect on tea shrub growth and development, it generally requires soil with a relative water content of 70 to 90 percent, 70 to 80 percent being most suitable.

The province is a major tea-producing region of China and a part of the tea-growing region south of the Yangtze River.[8] In 1915, the province's tea plantation area reached 470,000 mu and tea output was 330,000 dan. As of liberation, however, only 70,000-odd mu of the area remained, and output was 20,000-odd dan. Following liberation, vigorous revival and development took place, and by 1979 the tea plantation area had grown to 899,000 mu with an output of 184,000 dan. At the same time the degree of mechanization of tea production had steadily increased, and there were

8 The tea region south of the Yangtze is also termed the "central tea region," and includes Zhejiang, Jiangxi and Hunan, plus southern Anhui, Hubei and Jiangsu provinces. Since most the it lies to the south of the middle and lower reaches of the Yangtze River, it is also termed the "tea region south of the Yangtze River." It holds a particularly important position in the country's tea production in the large percentage of its total tea production and in the numerous varieties it produces.

almost 1,200 plants for the preliminary processing of tea leaves throughout the province. Machine processing of tea rose from around 20 percent to 60 percent, and 10 state-owned tea farms started the growing, initial processing and finished processing of tea in a single continuous process. Commune and brigade tea farms have developed very rapidly in recent years, the number totaling more than 1,000. Most of these tea farms are concentrated in continuous tracts and are managed by specialized teams. Simultaneous with increased building of commune tea farms has been active development in tea-growing areas of a mass campaign of experimentation, of the promotion of advanced scientific techniques, intensification of the training of the technical corps and steady improvement in the level of tea plantation management. As a result, tea yields for the province as a whole have risen from the past average 20 to 30 jin per mu to between 50 to 60 jin per mu, and a group of large-area, high-yield tea plantations have appeared that produce between 200 and 300 jin per mu. The province's tea plantations spread over more than 50 counties and cities, most of them being found in hill and mountain regions (on slopes with a gradient under 30 degrees). They are most concentrated in Shangrao Prefecture and Jingdezhen City in northeast Jiangxi and in the Xiu River basin in northwestern Jiangxi. There are a total of 22 key counties producing tea throughout the province that have existed historically or that have come into being since liberation. (See Table 2-22). In 1979, the tea plantation area of these two key counties amounted to about 69.2 percent of the province's total tea-growing area, and their tea output accounted for 83.2 percent of the province's total tea output.

There are three crops of tea each year categorized by the time of their picking as spring tea, summer tea and autumn tea. Jiangxi Province produces mostly spring tea of rather good quality. If classified in terms of processing, the province has three varieties, namely, dark green tea, black tea and light green tea, output of dark green tea being greatest, accounting for 60 percent of the province's total tea production. Producing areas are chiefly Wuyuan and Dexing counties, whose green tea is called, "Wulu." The green teas produced in Shangrao, Qianshan, Hengfeng, Guangfeng, Guixi, Yushan, and Yujiang counties are collectively termed "Raolu." "Shangmeizhou" tea from Wuyuan has been listed among the country's 22 famous tea varieties and is sold widely inside and outside the country. In 1979, Wuyuan had a 127,000 mu tea plantation area and an output of 53,400 dan of tea, becoming the very first tea-producing county in the whole province to break the 50,000 dan mark. In recent years, earnings from the growing of tea in Wuyuan County have accounted for more than 20 percent of gross earnings from agriculture throughout the whole province. Development of tea production has promoted tremendous rise in grain production. In 1979, the province's gross grain production was 2.2 times greater than it had been in 1949, and was 70 percent greater than in 1965.

Table 2-22. Tea Plantation Area and Gross Tea Output for 22 Key Tea-Growing Counties in Jiangxi Province

Area: Mu
Output: Dan

县 名 a)	b) 一九五七年	c) 一九六五年		d) 一九七九年	
	产 e) 量	面 f) 积	产 e) 量	面 f) 积	产 e) 量
g) 重点县合计	86395	368512	90138	622133	153183
h) 占全省比重(%)	87.8	89.5	91.9	69.2	83.2
i) 源	25055	93579	26700	136921	53407
j) 饶	9942	34000	10553	72689	10311
k) 景 德 镇	8207	43510	7678	58907	20000
l) 玉 山	2890	8000	3000	20669	3008
m) 广 丰	2800	9104	2100	6844	1738
n) 德 兴	2620	5094	1980	23319	3340
o) 铅 山	1210	9292	2024	20554	4145
p) 余 干	5116	23780	5108	1713	2668
q) 万 年	1708	3000	990	7955	1698
r) 修 水	14265	82000	20448	104166	22936
s) 武 宁	5703	19916	3900	41813	5384
t) 遂 川	2400	12000	1509	9940	1724
u) 泰 和	139	589	206	4364	1033
v) 铜 鼓	1940	5191	2543	5010	1479
w) 安 远	450	2243	196	7880	996
x) 余 江	464	6919	352	11553	3305
y) 彭 泽	427	2621	379	17545	1997
z) 丰 城	30	100	18	28453	4986
aa) 信 丰	/	127	14	10499	1613
ab) 上 犹	778	1834	49	6200	1589
ac 萍 乡 市	251	2522	298	18791	3589
ad 庐 山	/	3073	93	6348	2234

ae)资料来源：江西省农委

茶叶按采摘季节，可分为春茶、夏茶和秋茶三种。本省茶叶以春茶产量最多，质量较好。若以加工制造的品种来分，本省所产茶叶，则有绿茶、红茶和青茶三种，以绿茶

[Key for Table 2-22 on previous page]

Key:
- a) County
- b) 1957
- c) 1965
- d) 1979
- e) Output
- f) Area
- g) Key county total
- h) Percentage of province total
- i) Wuyuan
- j) Shangrao
- k) Jingdezhen
- l) Yushan
- m) Guangfeng
- n) Dexing
- o) Qianshan
- p) Yugan
- q) Wannian
- r) Xiushui
- s) Wuning
- t) Suichuan
- u) Taihe
- v) Tonggu
- w) Anyuan
- x) Yujiang
- y) Pengze
- z) Fengcheng
- aa) Xinfeng
- ab) Shangyou
- ac) Pingxiang City
- ad) Lushan
- ae) Source of data: Jiangxi Provincial Agriculture Commission

Black tea output is second only to green tea output accounting for 28 percent of the province's gross output of tea. Producing areas are located in Xiushui, Wuning, and Tonggu counties in the Xiu River basin of northwestern Jiangxi and in Jingdezhen (formally called Fuliang) in northeastern Jiangxi. The black tea produced in the Xiushui and Wuning areas is called "Ninghong." The red tea that Jingdezhen produces is called "Fuhong." Production has been going on for a fairly long period of time. The tea is characterized as being deep red in color and luster, and richly fragrant and strong. Both black teas are famous and are exported. In recent years there has been a trend for the black-tea-growing areas of Xiushui and Wuning counties to "give up black tea and take up green tea," and traditional black tea production has suffered somewhat as a result.

Light green tea accounts for about 12 percent of the province's total tea output. The main tea producing areas are Suichuan, Chongyi, Qingjiang, Lushan, and Yugan counties, and noted varieties are "Yunwu tea" from Lushan and "Gougunao" from Suichuan, which are supplied mostly to the domestic market.

Tea is an important special product of the province, and it is also a traditional export item. In 1979, 87,000 dan was exported. This was almost half the province's total tea output (and two-thirds of it was dark green tea). Earnings from tea exports account for 5.3 percent of the gross value of the province's trade, and such exports have made a definite contribution to the country's development of foreign trade endeavors. With future development of the national economy, the need for tea will become increasingly great everywhere. Jiangxi Province has superior natural geographic conditions and traditional experience for development of tea production. Full use should be made of the province's special situation and all potential tapped so that tea production sees even greater development. In addition to continuing to consolidate an annual output of more than 50,000 dan of Wuyuan tea, tea-growing areas such as Jingdezhen and Xiushui County, which already have a fairly good foundation and produce more than 20,000 dan, should nurture development energetically, thereby gradually becoming key tea-producing regions with an annual output of 50,000 dan. In developing new tea plantations, extreme attention should be given the running of commune and brigade tea farms, taking advantage of reliance on the strength of the collective economy to do a conscientious job of building tea production bases and marching ahead with production in breadth and depth. The principles of suiting general methods to specific circumstances, and proper concentration should be followed in laying out tea production patterns. Grain should grown where suitable, and tea should be grown where suitable, and competition between grain and tea for land, for fertilizer, and for the labor force should be solved. Scientific research on tea should also be intensified and the level of scientific tea farming and tea processing constantly raised. In the advance toward modernization of agriculture, efforts should be made to build tea farms into a garden-style and forest-style environment, to introduce superior varieties, to provide tea plantations with water conservancy facilities, to mechanize operations, and to make tea growing scientific, all at a high standard for consistently high yielding tea plantations.

Fruit: The province's outstanding geographic environment provides extremely favorable conditions for development of perennial fruit tree production. Numerous kinds of fruit including oranges, peaches, pears, plums and persimmons are grown in various places in Jiangxi Province. Honey oranges from Nanfeng County, kumquats from Suichuan County, and early ripening sandy-field pomelos from Ganzhou County are famous local products of the province. The quality of Nanfeng County honey oranges is particularly fine, and they sell briskly both inside and outside China. According to a record from the Warring States Period written by "Officer of the Imperial Household, Yu Gong," output of oranges from the area of Yangzhou and Jingzhou, which included Jiangxi, was listed among

items taxed. This shows that more than 2,000 years ago, citrus culture was already of substantial proportions in Jiangxi Province. By Tang and Song times, the province's citrus production had developed even further. "Orange Annals" written by Han Yanzhi of the Song dynasty 800 years ago lauded Nanfeng honey oranges as a most treasured variety of oranges with a thin skin and tender flesh, a distinctive flavor and a rich sweetness. They have been praised as "the king of oranges," and are a uniquely renowned variety throughout the world.

Oranges and tangerines are the most important of all the fruits the province produce. From the period immediately following liberation until the 1960's, the principal ones produced were Nanfeng honey oranges, red oranges from Xin'gan, Qingjiang, and Linchuan counties, and mandarin oranges from Ganxian and Xingguo counties, which were grown on an area of only 240,000-odd mu. After 1970, the growing of Wenzhou honey oranges expanded greatly until the present time when they are grown on more than 85 percent of the province's tangerine- and orange-growing area. In 1979, the area of oranges and tangerines in the province was 210,000 mu, which was 65 percent of the total area devoted to fruit growing. Gross output of oranges and tangerines was 656,000 tons, which was 55 percent of gross fruit output. Producing areas were mostly the basins of the Gan and Fu rivers including Nanfeng, Xin'gan, Qingjiang, Nancheng, Linchuan, and Ganxian counties, which have been made a part of the province's key fruit (tangerine and orange) base counties. The province's orange and tangerine areas may be divided roughly into three major tracts in terms of geographical location as follows:

1. The Xin'gan, Qingjiang tangerine and orange region: This region has a long history in the growing of tangerines and oranges, and is the area in the province with the largest growing area and the largest output. It grows mostly red oranges. The red oranges produced around the three lakes of Xin'gan and on the sandy flats of Qingjiang have long been a specialty of the province that has sold well both inside and outside the province.

In the all-time high year of 1958, the two counties produced total of 433,400 dan of tangerines and oranges, which was 64 percent of the province's total output. Later on, for various reasons including failure to implement policies, and competition between citrus crops and grain for land, for fertilizer, and for the work force, which could not be solved satisfactorily, orange and tangerine output declined. In 1979, orange and citrus output of the two counties amounted to only 293,000 dan, which was still 45 percent of the province's total output of oranges and tangerines. The soil is mostly alluvium in this region; the broad masses have plentiful experience in the growing of oranges and tangerines; and natural conditions are excellent for development of the growing of oranges and tangerines. It will be necessary in the future to implement appropriate policies and to solve satisfactorily the problems of investment, irrigation, fertilizer and technical direction needed for orange and tangerine production so that this region's orange and tangerine production revives and develops as quickly as possible.

Nearby Xinyu and Yichun counties also have a fairly long history in the growing of oranges and tangerines, and both their growing area and output are appreciable. The several thousand mu of new orange groves that Shanggao County has started on its red earth downlands in recent years also show very good prospects for development, and already rank as one of the province's key newly opened orange- and tangerine-producing areas. In the future, extremely serious attention should be paid to the prospective formation of a single-tract orange- and tangerine-growing area consisting of these three counties.

2. The Fu River basin orange and tangerine area: This includes mostly Nanfeng, Nancheng, Linchuan, Jinxi, and Jinxian counties with an area of more than 40,000 mu growing oranges and tangerines and an output of nearly 190,000 dan (1979). In general, the alluvial plain along both shores of the river is used mostly for the growing of Nanfeng honey oranges, and Nanfeng honey oranges of renowed quality are particularly grown in the suburbs of the Nanfeng county seat located in the middle reaches of the Fu River. Linchuan County has also been growing bright red oranges for a long time. In addition, the kumquats grown in Huwan in Jinxi County are fragrant and delicious; they are processed into orange cookies that sell well everywhere both inside and outside China. In recent years, the southern hill region in the southern part of this growing area has promoted the growing of drought tolerant and widely adaptable Wenzhou honey oranges. Today a very great potential exists in this growing area for increases in tangerine and orange output. The region has almost 2 million mu of wastelands and grassy mountains suitable for development of cash crops. All that is needed in improvement in water conservancy facilities and assurance of sufficient farmyard manure, and energetic development of orange and tangerine production will have bright prospects. Efforts should be made to built a continuous tract production base here.

3. The southern Jiangxi orange and tangerine region: This region's natural conditions are extremely favorable for the growing of oranges and tangerines, and it is an ideal place for future development of orange and tangerine production in the province. Orange and tangerine production has developed rapidly in this region in recent years, with virtually every county in the region growing them to form an important new area for growing oranges and tangerines. In 1979, the region's area in oranges and tangerines accounted for 12 percent of the province's total, and orange and tangerine output amounted to 16 percent of the provincial total. The growing area is fairly large and production fairly concentrated in Xunwu, Xinfeng, Anyuan, Ruijin, Yudu, Dayu, Huichang, and Ganzhou where mostly Wenzhou honey oranges are grown. In addition, the kumquats grown at Zaolin, Dakeng and Duizi in Suichuan County are also famous. In recent years, this area has also developed the growing of honey oranges and Guangdong tangerines, and has had an output of 60,000-70,000 dan annually.

Mulberry: The growing of mulberry and the raising of silkworms is an endeavor of benefit to the country and the people. Generally speaking, mulberry leaves may be harvested for feeding to silkworms in the same year that the trees have been planted. The silkworm raising period from larva incubation to cocoon formation takes only 20-odd days and roughly three crops may be grown each year. Cocoon silk is one of the finest raw materials for spinning, and not only do people like silk manufactures for use in daily life, but they are also a precious material that is indispensible to industry and national defense. The various sideline products resulting from the cocoon silk production process have various uses. In addition to being able to reel silk and weave silk cloth from the silkworm cocoons, the silkworm chrysalises can be processed into nutrient-rich food. In addition, silkworm dung makes an outstanding organic fertilizer. Scientific tests have shwon that dung from the growing of a tray of silkworm larvae equals 40 jin of chemical fertilizer, and the raising of large numbers of silkworms helps advance increased agricultural yields. Jiangxi Province has a more than 1,700-year-long history of growing silkworm mulberry. Before the war, the whole province's silkworm cocoon production reached an all-time high of 11,100 dan (1936). However, as a result of the devastation wrought by the Kuomintang reactionaries, as of the eve of liberation not much remained of silkworm production throughout the province. Only some peasant households in Xiushui and Gao'an counties raised them. Following liberation, vigorous efforts were made to revive and develop them, and as of the early 1960's, silkworm mulberry growing was being done in more than 40 counties (or cities) throughout the province, with nearly 50,000 mu of red earth hill wastelands being used for the purpose. In addition to the building of fairly large-scale silkworm mulberry farms near the provincial capital at Nanchang, a series of silkworm mulberry production bases was also built one after another in Gao'an, Xiushui, Taihe, Anfu, Guangfeng and Yushan counties. A total of 15 (now 12) state-owned silkworm mulberry farms were operated in the whole province. In 1960, the raising of silkworms reached an all-time high of 15,800 trays, and silkworm cocoon output reached more than 6,000 dan.

5. Forestry Production and Patterns

Jiangxi Province is one of the major timber and moso bamboo producing regions of southeast China. It is second only to Fujian Province as a base producing timber and bamboo in the east China region, holding an important position in annually providing the whole country with timber and moso bamboo. Forestry production is an important integral part of the national economy of the province. In 1979, theoutput value of forestry amounted to 4.2 percent of the gross output value of agriculture in the province. Moreover, in numerous distant mountain region counties, forestry production held an even more crucial position.

Table 2-23. Gross Output of Oranges and Tangerines From 20 Key Counties Producing Oranges and Tangerines in Jiangxi Province

Area: Shimu
Output: Shidan

县 a) 名	b) 一九五七年	c) 一九六五年		d) 一九七九年	
		面 e) 积	产 f) 量	面 e) 积	产 f) 量
g) 重点县合计	374095	30774	292889	98679	591796
h) 占全省比重(%)	81.8	61.8	91.5	47.0	90.2
i) 南丰	28239	1996	38217	19775	114591
j) 金溪	17305	1409	13541	3993	10607
k) 临川	22888	2873	15504	7638	36081
l) 新干	144292	6597	130135	16839	235881
m) 遂川	12979	4700	12893	6978	11050
n) 清江	119936	7965	68600	5792	57196
o) 新余	7607	511	5064	6911	8920
p) 宜春	6404	430	1319	4844	9231
q) 赣州市	2770	1001	1924	1097	7837
r) 兴国	5880	807	435	1349	6231
s) 赣县	2550	900	1800	2714	1603
t) 信丰	—	83	643	4220	12752
u) 于都	186	71	2	1120	11588
v) 寻乌	140	29	100	2667	22729
w) 安远	161	6	50	629	12325
x) 大余	300	538	29	1193	4595
y) 南城	74	120	2000	5194	14796
z) 进贤	143	243	15	2993	3946
aa) 会昌	1913	137	265	682	4797
ab) 瑞金	320	358	353	2051	5040

ac) 资料来源：江西省农委

[Key for table 2-23 on previous page]

Key:
- a) County
- b) 1957
- c) 1965
- d) 1979
- e) Area
- f) Output
- g) Key county total
- h) Percent of province total
- i) Nanfeng
- j) Jinxi
- k) Linchuan
- l) Xin'gan
- m) Suichuan
- n) Qingjiang
- o) Xinyu
- p) Yichun
- q) Ganzhou City
- r) Xingguo
- s) Ganxian
- t) Xinfeng
- u) Yudu
- v) Xunwu
- w) Anyuan
- x) Dayu
- y) Nancheng
- z) Jinxian
- aa) Huichang
- ab) Ruijin
- ac) Source of data: Jiangxi Provincial Agriculture Commission

A. Forest Resources and Their Distribution

Jiangxi Province has widespread hills and mountainlands with a warm, moist climate in which water and heat conditions are suitable for forest growth, and forest resources are extremely plentiful. A survey done by forestry units shows the province's reserves of living timber to total 262 million m^3. Apart from sparse forests, individual trees growing here and there, shelter forests, and firewood forest reserves totaling more than 44 million and that do not provide timber for final felling, actual reserves amount to 218-odd billion m^3, plus 800-odd billion stalks of moso bamboo.

Table 2-24. Gross Silkworm Cocoon Output From 10 Key Silkworm Mulberry Counties in Jiangxi Province

Units: Shidan

江西省10个蚕桑重点县蚕茧总产量

表2—24 单位：市担

县 a) 名	b) 一九五七年	c) 一九六五年	d) 一九七九年
e) 重点县合计	861	1840	1379
f) 占全省比重(%)	65.1	62.9	47.4
g) 修水	—	519	186
h) 广丰	120	191	196
i) 泰和	69	88	76
j) 高安	332	450	93
k) 进贤	9	20	123
l) 南昌	201	443	238
m) 玉山	130	105	80
n) 永新	—	6	216
o) 赣县	—	18	71
p) 黎川	—	—	100

q) 资料来源：江西省农委

Key:
- a) County
- b) 1957
- c) 1965
- d) 1979
- e) Key county total
- f) Percentage of province total
- g) Xiushui
- h) Guangfeng
- i) Taihe
- j) Gao'an
- k) Jinxian
- l) Nanchang
- m) Yushan
- n) Yongxin
- o) Ganxian
- p) Lichuan
- q) Source of data: Jiangxi Provincial Agriculture Commission

Broadleaf trees account for most of the timber reserves, amounting to approximately 99.14 million m^3 or 45 percent of the total. Second is masson pine at approximately 66.57 million m^3 or 30.5 percent, and China fir with 52.47 million mu of reserves, or 24.5 percent of the total. Trees of middle age are the largest percentage of the total totaling more than 110 million m^3, or approximately 50.8 percent. Mature forests amount to 76.33 million m^3, or 35 percent, and young forests amount to only 30.92 million m^3, or 14.2 percent. The foregoing situation shows that though there is a substantial amount of forest tree resources in the province for felling and to provide needs in building the national economy at the present time and for some time to come; still, unless a firm grip is taken on replacement of cutover land, the afforestation of barren mountains, and the transformation of remnant and secondary growth forests, the time will certainly come when a serious situation will occur when the growth of new forests does not keep pace with the felling of old ones. This is a problem that merits serious attention.

Most of the province's forest resources are found in the mountains that rim the lower reaches to the east, south and west of the five major rivers. Because of the effects of natural and socioeconomic conditions, distribution is extremely uneven. The Gan River basin has the broadest area and the largest amount of living tree reserves. The area of this basin amounts to 49.8 percent of the total land area in the whole province, and its live timber reserves amount to 59.3 percent of the province's total timber reserves. Most of the middle and lower reaches of the five rivers contain sparse, remnant forests or individual, scattered trees. Most of the trees are concentrated at below 800 m; above 1,200 m, most of the growth consits of low bushes or mountain grasslands.

Thirty-seven counties in the province have more than 3 million m^3 of live timber reserves. In terms of their geographic location, those on fairly concentrated tracts may be roughly divided into 11 fairly large forest regions (See Table 2-25). Of these fairly large forest regions, the largest ones are the Suichuan, Heshui, Ciyang Mountain and Mufu Mountain forest regions in which China fir predominates. The China fir trees grown in the Zhang and Gong river basins above Suichuan and Ganzhou have fine-quality timber. The tree trunks are straight, and the ratio of tree girth to height is a general 1:100. Historically this timber has been called "guanshang timber," and has enjoyed a unique reputation in domestic markets. The "Chen Mountain timber" produced in Anfu Chen Mountain in the Heshui forest region has a red center and is straight. Noted for being tall and straight and rot-resistant, it is even better than "guanshang timber." The forest regions of the "three souths," Anxun and Youjiang in Southern Jiangxi, Shihuajian in northwestern Jiangxi, and the upper reaches of the Dongan River in northeastern Jiangxi are predominantly pine and mixed trees. In the Dawang Mountain forest region, pine predominates. In the Wuyi Mountain forest region, mixed trees and pine predominate.

Table 2-25. Basic Situation in 11 Major Forest Regions of Jiangxi Province

a) 林区及包括县份		b) 森林复被率%	c) 立木蓄积量（万m³）		d) 毛竹蓄积量（万根）		e) 资源特点（立木树种构成%）		
			f) 小计	g) 占全省%	f) 小计	g) 占全省%	h) 杉木	i) 马尾松	j) 阔叶树
k) 全省			26253.26	100	76708.84	100	21.37	37.44	41.19
l) 三南林区	m) 龙南县	62.86	510.99	1.9	998.83	1.3	14.11	27.10	58.80
	n) 定南县	48.52	327.69	1.2	1001.59	1.3	17.34	38.58	44.08
	o) 全南县	60.62	550.13	2.1	414.31	6.5	19.24	38.97	41.79
	f) 小计		1388.81	5.2	2414.73	3.1			
p) 安寻林区	q) 安远县	63.03	1065.41	4.1	305.75	0.4	4.30	45.58	50.12
	r) 寻乌县	43.99	530.09	2.0	299.00	0.4	5.94	42.04	52.02
	f) 小计		1595.50	6.1	604.75	0.8			
s) 上犹江林区	t) 崇义县	67.24	1313.14	5.0	7115.54	9.3	17.33	27.98	54.69
	u) 上犹县	52.88	315.92	1.2	1517.57	2.0	30.44	46.03	23.53
	f) 小计		1629.06	6.2	8633.11	11.3			
v) 遂川林区	w) 遂川县	55.07	923.94	3.5	2927.95	3.8	55.83	16.94	27.23
	f) 小计		923.94	3.5	2927.95	3.8			
x) 禾水林区	y) 安福县	35.54	788.34	3.0	1448.39	1.9	31.19	34.34	34.47
	z) 永新县	41.25	442.98	1.7	355.72	0.5	43.54	22.08	34.38
	f) 小计		1231.32	4.7	1804.11	2.4			
aa) 大王山林区	ab) 乐安县	37.80	580.59	2.2	995.99	1.3	18.42	56.03	25.55
	ac) 宜黄县	27.88	416.08	1.6	2042.85	2.7	38.12	29.68	32.20
	ad) 崇仁县	41.31	273.96	1.0	1564.23	2.0	15.19	47.42	37.39
	f) 小计		1270.63	4.8	4603.07	6.0			
ae) 武夷山林区	af) 资溪县	50.82	592.58	2.3	2086.47	2.7	17.51	28.20	54.29
	ag) 南丰县	40.85	449.93	1.7	389.20	0.5	2.84	78.70	18.46
	ah) 黎川县	41.47	290.60	1.1	2075.50	2.7	11.10	26.70	62.20
	f) 小计		1333.11	5.1	4551.17	5.9			

[Table 2-25, continued]

林区及包括县份		森林复被率%	立木蓄积量（万m³）小计	占全省%	毛竹蓄积量（万根）小计	占全省%	资源特点（立木树种构成%）杉木	马尾松	阔叶树
ai) 石花尖林区	aj 铜鼓县	64.30	790.21	3.0	3423.16	4.5	44.24	31.20	24.56
	ak 宜丰县	48.01	560.86	2.1	4270.54	5.6	19.66	19.32	61.02
	f) 小计		1351.07	5.1	7693.70	10.1			
al) 莱阳山林区	am 奉新县	46.39	251.63	0.9	3508.27	4.6	32.57	23.08	44.35
	an 靖安县	57.80	601.91	2.3	2216.87	2.9	37.91	31.10	30.99
	f) 小计		853.54	3.2	5725.14	7.5			
ao) 乐安河上游林区	ap 婺源县	45.70	922.68	3.5	846.71	1.1	12.00	33.00	55.00
	aq 德兴县	39.68	749.20	2.9	566.62	0.7	3.30	30.80	65.90
	f 小计		1671.88	6.4	1413.33	1.8			
ar) 幕阜山林区	as 武宁县	28.22	756.43	2.9	1470.19	1.9	31.47	29.49	39.04
	at 修水县	46.08	797.07	3.0	422.78	0.6	41.30	32.80	25.90
	f 小计		1553.50	5.9	1892.97	2.5			
au) 十一大林区合计			14802.36	56.2	42264.0[illegible]	55.2			

av) 资料来源：江西省农林垦殖勘察设计院1975年8月全省林业资源普查资料

Key:
a) Forest region and counties in which it is found
b) Forest reforestation rate
c) Cubic meters of standing reserves (10,000 m^3)
d) Moso bamboo reserves (10,000 stalks)
e) Characteristics of resources (makeup of standing tree species %)
f) Subtotal
g) Percentage of provincial total
h) China fir
i) Masson pine
j) Broadleaf trees
k) Whole province
l) Three souths forest region
m) Longnan County
n) Dingnan County
o) Quannan County
p) Anxun forest region
q) Anyuan County
r) Xunwu County

[Key continued from previous page]

s) Shangyou River forest region
t) Chongyi County
u) Shangyou County
v) Suichuan forest region
w) Suichuan County
x) Heshui forest region
y) Anfu County
z) Yongxin County
aa) Dawang Mountain forest region
ab) Le'an County
ac) Yihuang County
ad) Chongren County
ae) Wuyi Mountain forest region
af) Zixi County
ag) Nanfeng County
ah) Lichuan County
ai) Shihuajian forest region
aj) Tonggu County
ak) Yifeng County
al) Laiyang Mountain forest region
am) Fengxin County
an) Jing'an County
ao) Le'an River upper reaches forest region
ap) Wuyuan County
aq) Dexing County
ar) Mufu Mountain forest region
as) Wuning County
at) Xiushui County
au) Total for 11 forest regions
av) Source of data: Data from a provincewide survey of forestry resources done in August 1975 by the Jiangxi Provincial Farming and Forestry Reclamation and Cultivation Reconnaissance and Design Institute.

The province also has relatively plentiful tree species. Main coinferous tree species are China fir and masson pine; main deciduous trees are camphor, phoebe nanmu, sassafrass, cypress, sawtooth oak, Castronopsis sclerophylla, Chinese toon, chinaberry, Alniphyllum fortunei, Chinese sweet gum, Schima superba, and Fortunes paulownia. In recent years, numerous valuable and quick-growing timber tree species such as Tsoongiodendron odorum have also been found that can be promoted in production. China fir forests may be divided into those that have been planted by man and those that have sprouted naturally to produce reforestation. They are found all over the province's hill and mountain regions on slopes and ravines. They are found mostly at below 1,000 m in elevation, and very few are found on mountains above 1,300 to 1,400 m. However, most of these have not grown well; they lack tops or have broken branches; and they are separated rather than in forests.

Masson pine is one of the province's important homegrown tree varieties. It has good-quality timber, grows rapidly, makes no strict demands on the soil, and tolerates dryness and infertility. It makes a fine starter tree specie for the afforestation of barren mountains. One also does not have to pay the same high price for it as for other tree species in readying the soil, afforesting and care. In addition, not only is it an important timber for mine props, for railroad sleepers, for making plywood, for making paper and for construction, but the output value of its rosin is more than 10 times as valuable as the output value of its timber. Serious future attention should be given to the growing and development of this specie of tree. Broadleaf trees are currently an outstanding component of the province's forests. Most of them are in mixed forests, and the number of varieties is complex. Broadleaf tree species differ greatly between north and south Jiangxi. In north Jiangxi, fagaceae and camellia family members predominate, while in southern Jiangxi there are numerous members of the lily magnolia family. Deciduous broadleaf trees are found mostly in the hills or mountainlands of northwestern and eastern Jiangxi where small leaf oaks [Quercus chenii], sawtooth oaks [Quercus acutissima] gron and where Alniphyllum fortunei is currently the fastest growing tree specie in the province. In addition, moso bamboo is found widely in the province's mountains and hills at below 1,000 m. Mostly of it grows in pure bamboo forests, but some of it grows intermixed with China fir.

Economic forests made up of woody plants that provide both food and oil and that have many uses such as tea oil, tung oil, Chinese tallow, oak, Chinese chestnut, lacquer, chinaberry, palm [Trachycarpus fortunei], and Cinnamomum cassia also are found widely in the province's hills and mountainlands. In recent years, test plantings in Yugan, Le'an, and Anyi counties of olive trees introduced from foreign countires are new varieties that have enriched the province's oil-bearing tree species. Practice has shown that very many advantages from development of economic forests. Not only do they not take up any cultivated land, but they also serve to conserve soil and water, to break the wind, to stabilize sand, and to help agricultural production. Pressing of the fruit produced by woody oil-bearing plants also produces very fine edible oil and provides raw materials for industry. Chinese chestnuts and acorns make very good foods in ordinary times, and during disaster years or periods of warfare, they may be used as grain. Acorns may also be used in industry in place of sizing made from grain, and they may be fermented to produce alcohol. They may be used as hog feed, and tannin may be extracted from their husks for use as a raw material.

B. Status of the Development of Forestry Production and Its Main Characteristics

During the 30 years since founding of the People's Republic, the province's forestry production has seen great development just as all agricultural production has. The province's afforested preserve area has reached more than 16.6 million mu, and the forest cover rate has climbed to 36 percent from the 30 percent of the period immediately

following liberation. A total of nearly 40 million m^3 of marketable timber has been provided the country, plus nearly 400 million stalks of moso bamboo. Forest industries of all kinds have accumulated 243 million yuan of capital for the country, and have also provided the country with large quantities of tea oil, tung oil, Chinese tallow and such economic forest products; forest byproducts having multiple uses such as rosin, plywood and fiberboard; plus mountain forest specialties, such as dried bamboo shoots, mushrooms, wood fungus and medicinal materials, which have given powerful assistance to the building of national socialism.

Major characteristics of the province's forestry production:

1. State-owned forests are relatively few in number, but commune and brigade forests have burgeoned. During the period immediately following liberation, there were only 100,000 mu of forests in the whole province. After more than 20 years of steady development and growth, the province has built more than 150 units engaged in forestry including state-owned forest farms, forest farms that are culled for the removal of some trees and the continued growing of others, and forest nurseries, which have been important mainstays in the building of forestry production. The province's state-owned forest are has increased to around 20 million mu (including 4 million mu of state-owned forest farms, 10 million mu of forests that are culled, and 6 million mu of forest farms on reclaimed wastelands). Today, more than 80 percent of the province's mountain forest area is collectively owned, and forestry production is carried out mostly by collectives. Since the founding of the People's Republic, building of forestry production in the province has undergone three main stages as follows: Because of limitations during the period immediately following liberation, very little mass afforestation was done. What was done was on a small scale, scattered and of not very high quality. With the subsequent transformation of production relationships, afforestation was done by production brigades or communes. Though the impetus and scale of this effort was large, and afforestation was concentrated on continuous tracts, nevertheless, because of insufficient implementation of policies relating to forest rights, the organization of labor and distribution of benefits, plus neglect of scientific afforestation methods, despite afforestation year after year in many places, no forests appeared. As a result of summarization of the lessons of experience during the last several years, plus organization of the masses in a major effort to tackle afforestation, the operation of commune and brigade forest farms, and the building of a specialized corps for year-round care, the former problem of afforestation with no followup care has been substantially solved organizationally, and despite the large scale of efforts, results have also been good. During recent years, Xin'gan County located in the middle and lower reaches of the Gan River has established more than 200 commune and brigade forest farms throughout the county's mountain and semimountain areas, and it has afforested nearly 340,000 mu with forest trees of various kinds, achieving a forest survival rate and preservation rate of more than 90 percent. In

this way, 93 percent of all barren mountains suitable for forests have been afforested, and the forest cover rate has reached 63 percent. The county has been hailed nationally as an advanced forestry county. Today, commune and brigade forest farms throughout the province total more than 8,500, and a specialized corps of more than 110,000 exists. Collectively owned timber forest bases cover 4 million mu, and there are 1.6 million mu of woody oil-bearing plant bases.

2. Very great development has taken place in the afforestation of hill regions lacking timber and lake plains areas, and the rate of self-sufficiency in timber is gradually rising. Since the founding of the People's Republic, yet another outstanding feature of the province's forestry industry production has been very great development of forestry production in hill regions lacking timber and lake plains areas. Gao'an, Jinxian, Dongxiang, Yugan, Jiujiang and Duchang counties located around the shores of Boyang Lake have planted nearly 3 million my of mountain forests. Their young forest survival rate is high, and the preserve area is between 70 and 80 percent of the total afforested area. Gao'an County located at the southern tip of Boyang Lake is a classic red earth hill region. Up until the time of liberation, it had barren mountains and unruly rivers, was prone to drought and waterlogging, and frequently experienced drought and flood disasters. Not only was there a severe shortage of timber, but even firewood was extremely scarce in numerous places. In recent years, they have combined a mass movement with the use of a corps of specialists for the afforestation of more than 300,000 mu, more than 50,000 mu of which was afforested with economic trees producing fruits or seeds such as tea oil. This county has already become one in which all-round development of farming, forestry, animal husbandry, sideline occupations and fisheries has taken place, and that has made a substantial contribution to the country. It has also become an advanced county in forestry production nationally.

3. Greening and afforestation has gradually developed from small scattered plots to concentrated continuous tract forestry bases. With the rapid development of state-owned and commune and brigade-operated forest farms, as a result of the summarization of experiences gained in the process of many years of afforestation, gradually the emphasis has changed from the afforestation of small scattered plots to concentrated continuous tracts, the better to improve management, to increase efficiency in caring for trees, and to heighten the commodity rate in forestry production. The whole province has preliminarily built a large number of timber forest bases containing mostly China fir, and economic forest bases containing mostly tea oil, tung oil and olive trees.

4. In some places suitable for reforestation, a gradual change has been made from the selection of trees of a certain girth for felling to complete felling on small plots, following the principle of felling timber of similar age. Formerly many of the province's forest regions culled trees for cutting according to their girth "taking the fittest," with the result that timber with a relatively small circumference was not used fully and rationally. This resulted in a waste of timber and hurt

the renewal and care of resources. Following liberation, as a result of improved planning of felling, this situation gradually improved, and the degree to which resources are fully and rationally used has increased.

Today the province's forestry production remains a weak link in the building of its national economy. This is manifested principally in the following ways:

First is much afforestation, but a small preserve area and with the forest cover rate remaining low. Since the founding of the People's Republic, despite the afforestation of a cumulative more than 50-million-mu area of the province, the actual preserve area is only 10 million-odd mu. There are still several tens of millions of mu of barren mountains and grasslands in the province, as well as large areas in the "four besides" beside streams, roads, villages, and houses that have not been planted to trees. The passive situation of a timber shortage and a lack of firewood in some timber-short counties has not yet been fundamentally turned around. Though Jiangxi Province is one of the key timber-producing province's in south China in which the forestland area averages nearly 3 mu per capita, which is vastly more than the national average (1.8 mu); nevertheless, live timber reserves average fewer than 8.5 m^3 per capita, which is lower than the national average.

Second, forest reserves have declined markedly, and a particularly great decline has taken place in forests that can be developed for use. Calculations made by forestry departments show the annual net rate of forest growth for the province as a whole averages 3.19 percent, which translates into the growth of 6.7 million m^3 of timber annually. However, the amount of annual timber consumption for the province as a whole (including the amount cut by society) is more than 10 million m^3, so the amount of timber cut is more than 30 percent the amount that grows. As a result of excessive cutting of forests, a serious imbalance exists between the ratio of cutting to growing, and in some places serious damage has been done to the natural environment on which people depend for their existence and increase. In addition, as a result of expansion in the building of thenational economy, needs for timber have greatly increased on all sides, and the conflict between timber supply and demand has become increasingly prominent. The number of counties in the province lacking timber has increased to 35 from the 15 of the 1950's.

Third has been the very great decrease in economic forest trees, and this has seriously hurt the national economy and the people's standard of living. Historically, Jiangxi Province has been an exporter of tung oil. During the all-time high year of 1973, tung oil production reached 8 million jin. During the past several years, output has averaged only 3.4 million-odd jin annually, a decline by more than one-half. In the all-time high year of 1975, the province's output of Chinese tallow tree oil reached 4.98 million jin. During the past 3 years, it has averaged only 2.03 million jin, a decline of more than one-half. Because of little cultivation of tea oil over a long period of time, output of tea oil from tea oil forests averages only about 5 jin per mu today.

Fourth has been lack of across-the-board planning in the development of mountain regiwns, chaotic management of forest regions, more than one organization being responsible for operations, emphasis on felling to the neglect of planting, and reckless cutting and denudation that has damaged forest resources and increased the number of scrub and cutover secondary growth forests, thereby hurting both thequantity and quality of timber.

In addition, the labor productivity rate for forest enterprises has been low, and the overall utilization rate for forest resources has been low as well. Failure to use large quantities of leftovers from timber processing, and serious loss and waste are also problems that cannot be overlooked.

C. Major Direction and Means of Hastening the Building of Forestry Production

Forests play an extremely important role in improving the environment and in the conservation of soil and water. Good preformance in the planting of trees for afforestation can regulate the climate, lock up sources of water, conserve soil and water, break the wind and consolidate sand, and preserve the balance of the natural ecological system, thereby assuring consistently high yields from farming and animal husbandry. In addition, the planting of trees for afforestation is also an important way in which to reduce pollution, to beautify the environment, to provide more sites for rest and sightseeing, and to promote people's physical health. In its future development of forestry production, the province should direct serious attention to the following several matters:

1. Suiting of general methods to specific circumstances, making rational patterns of distribution, and vigorously launching mass planting of trees for afforestation, the replacement of cutover areas, and the transformation of forest stands. On the one hand, a firm grip must be taken on the planting of trees as quickly as possible on all barren mountains in the province that are suitable for afforestation (including mountains that have been afforested but do not yet have forests) and the "four besides," so that land that has not been fully used for a long period of time is able to create more material wealth for the country. On the other hand, it is necessary to bring into full play the production potential of existing forestlands. Currently forestland live forest reserves in the province average only about $3m^3$ per mu, which is vastly lower than the production potential that the forestland is capable of providing. Places overgrown with scrub that do not look much like forests and "appear to be green mountains when looked at from a distance, but are seen to have no useful timber when looked at up close," places where forest growth is slight, and scrub forests or thin forests from which yields per unit of area are small should be energetically transformed. Their administration and management should also be improved, full use made of water, heat and light energy, and both the amount of forest stand growth and yields per unit of area improved.

The pattern of future afforestation should be as follows: emphasis on development of timber forests in distant mountain regions, with some development of economic forests. Vigorous development of timber forests in nearby mountain regions simultaneous with active development of tea oil, tea, mulberry trees, medicinal herbs and firewood forests. In hill regions, the emphasis should be on development of economic forests, principally the growing of tea oil trees and tea, and active development of timber forests and firewood forests. On plains and lake regions, the greening of barren hills and the "four besides" should be intensified, with emphasis on solution to the lack of firewood in rural villages and timber for the use of the people. In seriously eroded areas, preventive measures should be taken against disasters, with vigorous afforestation for the conservation of soil and water that combines the growing of bushes and shrubs, and closing off mountains in order to grow forests. In the planting of timber forests, general methods should be suited to specific circumstances, generally with mixed forests predominating containing China fir, pine, sassafras, camphor, hpoebe nanmu, paulowina, Schima superba, oak and moso bamboo, all of which are rather good mixed tree species. When these trees with differents habits and characteristics are grown together, they are both to make full use of light energy to carry out photosynthesis, and are able to make full use of soil fertilizer and moisture to accumulate body. In addition, mixed forests produce plentiful dry branches and fallen leaves, which help improve the soil's moisture, fertility, and aerobic conditions, improve soil structure, and promote forest tree growth. When considering afforestation, mixed forests may be grown in strips or in plots for convenience in logging operations.

2. Energetic attention to the building of forestry bases. Today there are more than 37 forest counties throughout the province. Without doubt, these are the province's main forest production bases, and energies should be concentrated on looking after them. However, it should also be realized that since the province is a vast one with outstanding natural and geographic conditions, it is suitable from south to north and from the mountain regions to plains, every county is suitable for development of all sorts of forests. Consequently, in addition to giving attention to key timber-producing counties, a group of timber forest, bamboo forest, economic forest, and firewood forest bases of different kinds and of different size should be built by suiting general methods to specific circumstances on the basis of individual conditions and characteristics in each county so as to be able to meet needs in development of the national economy and the people's standard of living. Practice has demonstrated that firm attention to the building of forestry bases helps in proceeding from realities, in making full use of natural conditions such as local climate and soil, using land for farming that should be used for farming, land for forestry that should be used for forestry, and land for livestock that should be used for livestock, relying on mountains for a living, nurturing the mountains while making a living, and increasing the cash earnings of the country, the collective and commune masses; it also helps in the exploitation for use and the development of forest resources, and the building and consolidation of timber and bamboo

bases as well as all sorts of forestry sideline product bases, thereby providing the country greater amounts of marketable timber and bamboo and forestry sideline products.

In places where natural conditions are superior and forest resources abundant, and where the masses have been long accustomed to and possess long experience in running mountain forests, vast prospects exist for development of forestry production. On the other hand, places in which conditions for development of agricultural production are relatively poor, mountain region counties or mountain region communes and brigades should be designated in accordance with provisions of the forest law. However, there should be no "arbitrary uniformity." In the designation of forest region counties, communes and brigades, some places may be devoted mostly to forests, with some portions being devoted mostly to the growing of grain or to animal husbandry depending on the size of mountain forests and operating conditions. In some places, farming, forestry and animal husbandry can be simultaneously carried out. Counties, communes, and brigades that have been designated as forestry bases should energetically operate state-owned forest farms for forestry operations, forest farms that are culled for cutting and for continued growth, and commune and brigade forest farms, with resolute emphasis on a program for building forestry production of "using forest management as the basis, simultaneous afforestation and care, more afforestation than felling, a combination of felling and growing, and multiple uses." Emphasis should be placed on afforestation, nurture of forests, shelter forests, and the hauling of timber and bamboo, with active development of economic forest trees such as tea oil and tung, and good performance in making multiple uses of forest resources. The country should give requisite assistance in funds, equipment and technical forces so that forest regions will be built as quickly as possible to become socialist forestry bases in which the more that is cut, the more remains; the more that is cut, the better the quality; and so that the green mountains will endure and operations will continue forever.

In the building of forestry bases, attention must also be directed to correct handling of the relationship between centralized continuous tracts and growing the right trees on the land. On centralized continuous tracts, the principle that must be used is growing the right trees on the land. One cannot be heedless of growing conditions or the habits and character of tree species, ill-advisedly emphasizing centralized continuous tracts. Such tracts should include various kinds of trees, and attention should be paid to the growing of some economic forest trees such as coniferous trees and tea oil trees in order to solve the urgent needs of the national economy and the people's standard of living for timber and edible oil. Growing should not be limited to fir trees and tea oil trees alone. Continuous tracts may be gradually brought into being through several years or many years of afforestation, and no attempt should be made to plant several thousand or several tens of thousands of mu of continuous tracts all of a sudden.

3. Adherence to sensible felling and major efforts in using forests in multiple ways to raise the timber utilization rate. Though the province has plentiful forest resources, as building of the "four modernizations" develops, the conflict between supply and demand for timber and all kinds of forest byproducts will become increasingly prominent. It is necessary to broaden sources of supply and reduce consumption, and to change rapidly the current situation in which some places emphasize felling and slight afforestation, cutting much and afforesting little, or cutting only and doing no afforestation at all. Reckless cutting and denudation must be resolutely halted. Timber production must proceed from the preservation of forest resources through implementation of sensible felling, cutting of proper amounts and making replanting and afforestation the centerpiece in the building of forest regions. Where too much felling is done, timber production quotas should be suitably adjusted downward to give the forest regions time to rest and recuperate. If plentiful forest resources are to produce greater economic results, energetic efforts should be made to increase the timber utilization rate. The province's economic timber outturn rate is still low, and the forest tree utilization rate stands at only about one-half of the total volume of each tree; large quantities of branches are completely wasted. Administration and management must be improved, trees used in multiple ways, and large quantities of processing leftovers as well as leftovers from felling forest regions should be used to the full. A single tree should be used in many different ways, and active efforts should be made to set the stage for development in the direction of use of whole trees and use of whole forests.

4. Energetic upgrading of the mechanization of forestry production, with active improvement in wood and bamboo, and in forest byproducts hauling conditions. In places in which forest resources are plentiful but the terrain complex, logging operations difficult, and assembly and hauling of timber hard, mechanization should be particularly emphasized so that the plentiful forest resources are developed and used, and so that natural dessication is reduced. For forests in high and craggy mountains and in watershed areas, across-the-board consideration should be given to factors such as use of felling methods that conserve water and protect agriculture. In some cases, felling will have to be restricted, and in some places the forests will have to be designated shelter forests.

5. Intensification of forestry research work. A scientific three-tier forest network should be spread as quickly as possible, energetic efforts made to train commune and brigade forestry scientific and technical forces, and conscientious efforts made to select superior tree species for promotion. It is particularly necessary to emphasize valuable tropical timber-tree species suited to growth in Jiangxi Province, and the protection and propagation of economic-tree species, as well as to change the current situation of a welter of species with an intermingling of the good and the bad. In the forestry operations and timber industries, further emphasis should be given to scientific research on forest production chemical industries and forestry machines to meet the province's needs in development of forestry production.

6. Animal Husbandry Production and Patterns[9]

A. Hog-Raising Industry

High-speed development of hog-raising enterprises holds great significance for development of the national economy and improvement of the people's standard of living. Pork has an important position in the people's lives, and it has always been one of the major meat sources to which the people are accustomed. The feeding period is short and hogs gain weight fast. After 7 to 8 months, or 1 year at most, a piglet will reach a weight of more than 150 jin. Pork is very high in calories, containing 599 kilocalories per gram. Its caloric content is second only to that of olive oil among all foods. In addition, it contains large amounts of nutrients such as fat, protein, phosphorous, iron, calcium and sugar necessary to the human body. Furthermore, all of a live hog's body is a treasure. In addition to providing meat, it also provides hog bristles, pigskin, bones, and offal, all of which are important raw materials for light industry. Hog raising helps development of light industrial production and foreign trade. In 1979, the province exported nearly 220,000 head of live hogs, and nearly 130 tons of frozen pork and pork products. Earnings from hogs and prok exports amounted to nearly 5 percent of the province's earnings from foreign exports. Hog raising provides manure for farming, which is of very great pertinence in promotion of the all-round development of agricultural production. "A hog is a small organic fertilizer plant," and manure from pig sties is currently a major source of farmyard manure. Much is produced; it can be accumulated easily; it comes from a steady source, and quality is good. It is an organic fertilizer that has all elements including 0.6 percent nitrate, 0.4 percent phosphate, and 0.5 percent potash. One hog daily excretes an average of about 16 to 18 jin of manure and urine. When the straw and limed soil used for hog sty bedding is added to this, at least between 30 and 40 dan and as much as 70 to 80 dan, or even 100 dan per year is accumulated. This is equal to the nitrogen content of between 60 and 120 jin of ammonium sulfate. Hog dung can satisfy farm crop needs for nitrate, phosphate and potash, can improve the soil, increase soil fertility, and is much superior to large amounts of chemical fertilizers. Additionally, hog raising is also an important household sideline occupation in rural villages that makes full use of auxiliary labor and commune members participating in collective labor in their spare time. It helps enlarge the number of commune members who increase their incomes.

Jiangxi Province has a definite foundation for development of the hog raising industry. Every jurisdiction has numerous superior local hog varieties suited for local feeding and care. One example is the Leping County hog that provides both meat and fat, grows fast, has thick flesh, and has a high slaughter rate. Piglets are provided not only to

9 Data on the patterns of distribution of livestock and poultry varieties was obtained mostly by consulting "Jiangxi Regional Livestock and Poultry Varieties," which was published in December 1964 jointly by the Jiangxi Provincial Department of Agriculture and the Jiangxi Provincial Agriculture and Forestry Reclamation Department.

the province, but are also marketed far away in provinces such as Anhui. Another hog is the Yushan County black hog, which matures early and adds both meat and fat at the same time. Its skin is thin and its meat tender and tasty. Piglets are also sold inside the province and all over Zhejiang Province. Additionally there are Ganzhou County white hogs, Xingguo County "tea plantation hogs," and Le'an hogs, all of which enjoy a certain reputation. These local hog species may be divided into more than 10 types on the basis of the color of their hair, their external appearance, and their production capabilities. They are found in the Boyang Lake region of northern Jiangxi, where mostly northern Jiangxi black hogs, northern Jiangxi mottled hogs, and northern Jiangxi hogs with six white patches are grown. In addition, there are mottled hogs from Fuzhou and northeastern Jiangxi mottled hogs. In the eastern hill and mountain region of Jiangxi, eastern Jiangxi black hogs, northeastern Jiangxi black hogs, and northeastern Jiangxi mottled hogs predominate. In the western hill and mountain region of Jiangxi, mostly hogs that are black on both ends and northwestern Jiangxi mottled hogs are raised, plus northern Jiangxi black hogs and Ji'an mottled hogs. In the Jitai Basin of central Jiangxi, mostly Ji'an mottled hogs are grown. In southern Jiangxi, southern JIangxi hogs with three kinds of mottling and white hogs from Ganzhou County dominate, with some black hogs from eastern Jiangxi and mottled hogs from southwestern Jiangxi being found. Prior to the War of Resistance Against Japan (1935), the province began the introduction of hog breeds from abroad, and these were crossed with local breeds in Nanchang, Taihe and Ganzhou counties. The breeds included Yorkshire and Berkshire hybrids, which showed remarkable hybrid heteroses and were in much demand everywhere. Following liberation, the province again introduced Landrace hogs, plus large white hogs from the USSR. Today, in addition to raising local hog varieties, all parts of the province also have a substantial proportion of hybrid hogs.

Very great development in live hog production has taken place in the province since liberation. Comparison of 1979 with 1949 shows a 3.6-fold increase in the number of live hogs in inventory throughout the province for an incremental annual increasing averaging 5.2 percent. In addition to private hog raising by peasant families, the raising of hogs by state farms and commune and brigade collectives has also developed very greatly, each being responsible for 6 percent and 5 percent, respectively, of the number or live hogs in inventory throughout the province. Hogs in inventory average two head per household engaged in agriculture. In 1979, a total of nine counties provided the state with more than one head of marketable hogs per household (See Table 2-26). These counties were Shanggao, Wannian, Gao'an, Dongxiang, Xin'gan, Xiajiang, Xingzi, Wan'an, and Xinyu. Most of these counties are located in the Gan and Fu river basins and in the Boyang Lake region. Livestock feed is plentiful there and good feeding and care is given. As a result, the hog-raising industry is fairly advanced.

Table 2-26. Counties in Jiangxi Province in 1979 With Households Averaging Two Head of Live Hogs in Inventory and Providing the State With More Than One Head

城及鄱阳湖区，那里饲料丰富，又有良好的饲养管理，因而养猪业比较发达。

表2—26 江西省一九七九年户平生猪存栏两头、贡献一头以上的县

	县 a) 名	年末生猪存栏数 b)(万头)	户平存栏 c) 头数	收 d) 购生猪数 (万头)	户平贡献 e) (头)	生 f) 猪出栏率 (%)	畜牧业产值占农业总产值 g)(%)
h)	全省水平	1004.66	1.9	371.05	0.7	69.2	10.5
i)	上高	17.83	3.5	5.95	1.2	62.2	12.0
j)	万年	11.11	2.3	5.53	1.1	77.3	12.8
k)	高安	23.27	2.1	12.30	1.1	78.8	13.8
l)	东乡	15.45	3.0	4.97	1.0	61.7	12.8
m)	新干	12.16	2.9	4.08	1.0	55.5	11.3
n)	峡江	5.80	2.7	2.22	1.0	66.2	11.1
o)	星子	8.00	2.7	2.83	1.0	62.8	14.8
p)	万安	8.39	2.4	3.51	1.0	76.3	24.5
q)	新余	20.41	2.3	8.84	1.0	75.7	20.4

r) 资料来源：江西省农委

Key:
a) County
b) Yearend number of live hogs in inventory (10,000 head)
c) Average number of head in inventory per household
d) Number of live hogs bought by state (10,000 head)
e) Average contribution per household (head)
f) Rate of removal of live hogs from inventory (%)
g) Animal husbandry output value as a percent of the gross output value of agriculture (%)
h) Whole province
i) Shanggao
j) Wannian
k) Gao'an
k) Dongxiang
m) Xin'gan
n) Xiajiang
o) Xingzi
p) Wan'an
q) Xinyu
r) Source of data: Jiangxi Provincial Agriculture Commission

It should be pointed out that as a result of the lack of harmony between farming and animal husbandry left over from the old society, many places did nothing but farming. In particular, the farming of nothing but grain that continues to exist has frequently led to restriction of the development of live hog production as a result of grain production. Comparison of 1965 with 1949 shows the number of live hogs in inventory in the whole province to have increased 1.77-fold, for an average 6.6 percent annual incremental increase, which is the same as the average increase nationally. If 1979 is compared with 1965, however, the increase is 65.2 percent for a 3.7 percent average annual incremental increase, which is lower than the national average speed of growth. This happens to be similar to the situation in the province's grain development for the same period, reflecting a close correlation between grain production and the raising of hogs. In order to set up an equitable agricultural economic structure so that the province's future grain production and hog raising will both see relatively great coordinated development, it will be necessary to persevere in carrying out a program in which farming and animal husbandry are linked. In plains and hill regions where farming predominates, full use should be made of the fine foundation for grain and oil production, the large amount of agricultural and sideline products, the large hill and water area, the high temperatures, the plentiful rains, the long hours of sunshine and sources of green fodder that grows wild, and such superior conditions. While continuing to give vigorous encouragement to commune member family raising of hogs, a group of state-owned or commune and brigade collectively owned marketable hog production bases should be built in a planned way. In hill and mountain regions where forestry predominates, a program of simultaneous development of farming, forestry and animal husbandry should be pursued, with active development of the raising of hogs or other herbivorous livestock through the suiting of general methods to local circumstances. In cities, and in industrial and mining areas, there should be gradual building of a group of modern hog-raising farms. In plains areas and mountain regions, and in rural villages and suburbs alike, development of the hog-raising industry should have as its main goal an increase in the rate of removal from inventory and the dressing rate, bringing about a genuine change in the long feeding period and the low removal from inventory rate.

Fodder is a fundamental requirement for development of the hog-raising industry. The main way to solve the fodder problem is through comprehensive planning, and increase in the growing of fodder. In the future, hill regions will have to suit general methods to local circumstances for increased growing of high-yield crops such as corn, sweet potatoes and pumpkins. The lake region and places having ponds and water surfaces can make full use of water surfaces to grow water cabbage, water peanuts [Alternanthera philoxeroides], and water hyacinths and set up complete, permanent fodder bases. This can be complemented with large-scale gathering of wild-growing fodder. In many places in the province, the masses have never "gone to work emptyhanded, and have returned with a basket of grass." They have been accustomed to using spare time from farm work to gather wild-growing fodder, and this practice should be encouraged.

Energetic promotion of the use of mixed feeds is an important indicator of the extent of modernization of feeding and management in the hog-raising industry, and it is also an important way in which to solve the current problem in many places of using just a single kind of fodder that is nutritionally incomplete to raise hogs. The experience of units such as the Lidu Commune Veterinary Station in Jinxian County has demonstrated that by using mixed for the raising of hogs, little grain is used, costs are low, flesh forms quickly, meat quality is excellent, the rate of removal from inventory is high, and it is possible to achieve the goal of improving the return from feeding, to lower hog-raising costs, and increase the removal from inventory rate. All jurisdictions should actively create conditions to propel the raising of hogs in the direction of using mixed feeds.

The prevalence of epidemic diseases is a great enemy to the development of hog production. The main epidemic diseases in Jiangxi Province are hog cholera, swine erysipelas, hemorrhagic septicemia, piglet paratyphoid fever, hog asthma, and piglet white diarrhea. In order to meet needs for development of hog raising, the province has set up more than 1,700 livestock veterinary stations staffed by a specialized corps numbering more than 12,000, which has played a major role in the prevention of livestock epidemic diseases, and which has scored fairly remarkable accomplishments particularly in carrying on and developing the province's traditional Chinese medicine techniques of applying acupuncture, moxibustion, and herbs to the treatment of illnesses. Following liberation, the province set up a biological pharmaceutical plant in its capital city of Nanchang. This plant not only provides the province with needed vaccines, but also assists fraternal provinces.

By way of hastening development of the province's live hog production, major efforts will have to be made in the future to promote artificial insemination to quicken improvement in hog breeds. Good performance in improvement of tools for raising hogs will require gradual development in the direction of mechanization and factorization. It will also be necessary to take in hand the building of live hog export bases in Jinxian, Wannian and Yujiang counties. At the same time, attention will have to be placed on economic results, and full use made of the pasture grass growing season and patterns of hog growth and development in order to shorten the time required for fattening and raise the removal from inventory and the dressing rates so as to achieved greater economic results from less consumption of fodder.

B. The Cattle-Raising Industry

Plow oxen are the most important draft animals used in the province's agriculture, and include both yellow oxen and water buffaloes. In hill and mountain regions, oxen predominate; in lake and river valley plains areas, water buffaloes are more numerous. However, for the province as a whole, oxen are more numerous than water buffaloes. As a result of the province's natural environment and conditions of feeding and care, a substantial number of local breeds have come into being through

long-term use and selective breeding by the province's working people. Take oxen, for example. There is the Guangchang ox of southeastern Jiangxi and the Boyang ox of the lake region, whose build is second only to that of the Guangfeng ox. Their production capabilities are also good. Shanggao oxen and Gao'an oxen, are also noted for theit fairly high ability to produce milk, while Guangchang oxen are strong in plowing. Water buffaloes are found in Yongxiu, Boyang, Duchang, Nanchang, Yugan, Xingzi, De'an, Jinxian and Xinjian counties, with lake water buffaloes being best. They have long bodies with a solid build, and are very strong draft animals. Though somewhat shorter in stature than the nationally famed Hunan, Hubei, Sichuan and Anhui water buffaloes, they are well developed, and their chests are particularly well developed. They make outstanding draft animals and they are one of the country's superior breeds of water buffalo.

Prior to liberation, an overwhelming majority of places in the province raised plow oxen which they used mostly for plowing the fields and little else. The raising of dairy cows and beef cattle was extremely limited. After liberation, when many mountain villages built highways, the use of plow oxen for multiple purposes, such as pulling carts, increased and with steady rise in the people's standards of living, in particular, very great expansion of the raising of dairy cows took place. Today dairy cow farms of varying sizes have been built everywhere in the provincial capital and in the cities and suburbs of prefectural capitals. At the Nanchang Superior Breed Livestock Breeding Farm, the number of dairy cows has increased to more than 1,200 head (including more than 750 head of production cows). These cows produce more than 5 million jin of fresh milk annually. This farm's dairy produces more than 80 percent of the whole province's output of total butterfat milk powder (1978 figure). In addition to raising mostly dairy cows, in recent years the farm has also imported superior breed Murrah water buffalo, Charolais cattle, and Xindi [6580 0966] red cattle from abroad for breeding and promotion. It has already provided frozen semen to more than 60 locations in more than 50 counties throughout the province for crossing with local cattle breeds to improve breeds. In order to meet the needs of the export trade and people's lives, beef cattle production has also developed in province in recent years. Provincial departments concerned have set up more than 10 beef cattle production bases in counties with a fairly good foundation in the raising of cattle such as Taihe, Wannian, Yongxin, Gao'an, Shanggao, Yushan, Guixi, Linchuan, Duchang and Yujiang counties.

Overall the province's development of a cattle-raising industry continues slow and at a low level. It is very much unable to meet needs for development of agricultural production and increasing requirements for steady improvement in the people's standard of living. In 1979, the province had a total of 2,115,000 head of plow oxen in inventory (including 1,608,000 head of draft oxen) versus 1,477,000 head in 1949, an increase of only 43.2 percent, and versus 2,332,700 head in the all-time high year of 1969, a 9.3 percent decrease. Furthermore, the number is continuing

to decline in some places, particularly in some places in southern Jiangxi where the number of draft oxen is felt to be insufficient. The supply of cow's milk averages only 3 liang per capita per year, given the province's present cow's milk output.

C. Raising of Goats and Rabbits

Development of raising goats and rabbits is an enterprise entailing little expenditure of money, low costs, much profit, and large benefits, thus killing many birds with one stone. Goats and rabbits are grass-eating livestock that tolerate coarse food and that are easy to raise and care for. Both rams and ewes are pastured for the most part. Only on days of severe cold, great rainfall, and heavy snows, when they are fed in sheds, do they require small amounts of supplementary fodder. Though rabbits are raised mostly in cages, there are numerous kinds of fodder than may be fed them. Any nontoxic tree leaves or green grass may be used as fodder. As a result, costs are lower and profits higher in the raising of goats and rabbits than in the raising of hogs. In addition to the meat and skins that the raising of goats and rabbits provide, manure may also be accumulated for farming. Scientific analysis shows the fertilizer efficiency from 1 dan of goat manure to equal that of 1.25 dan of human feces. Jiangxi Province has large quantities of green grass, plus stalks and stems of crops that may be used as fodder all year round. Conditions for the growing of goats and rabbits are extraordinarily superior; numerous places have long been accustomed to raising goats and rabbits, and the raising of these animals in rural villages is an important avenue of sideline production for individual commune members and commune and brigade collectives alike. Formerly the province raised mostly goats and local varieties of rabbits. The province's local goat varieties and their areas of distribution may be roughly divided in terms of natural conditions, into the following four categories:
(1) Northeastern Jiangxi goats. The main producing area is Guangfeng County, with distribution in Shangrao, Yushan, and Qianshan counties. These goats tolerate coarse fodder, have great vitality, sturdy legs and hard hoofs. They are a fairly good regional goat breed in the province. This region produces much miscellaneous grain other than wheat and rice and sources of agricultural byproducts are plentiful. However, the soil-utilization rate is high, so the masses do not do much pasturing.
(2) Southern Jiangxi goats. These are found mostly in the "three souths" in the extreme southern part of the province, as well as in Anyuan County. The climate is mild in these places and green grass thrives on the mountains providing a fine environment for the raising of goats. The area has a long history of goat raising. (3) Western Jiangxi goats. In this region, the main producing areas are Wanzai and Pingxiang counties, with Shanggao, Fenyi, Gao'an, Yichun and Tonggu counties also growing goats, largely as a sideline occupation. Small flocks are pastured. The most salient feature of goats in this region is their strong powers of propagation. (4) Northern Jiangxi goats. Xiushui and Wuning counties are the main producing areas, with the area around Ruichang, Jiujiang and Xingxi counties also growing goats. In these places, goats are generally tolerant of coarse fodder, are strongly disease-resistant, are

widely adaptable, and have a high slaughter rate. Following liberation, the province also imported fine-hair goats from Xinjiang Province and raised them successfully in experiments conducted at reclamation farms in Lushan, Yugan, and Yunshan. They have not spread rapidly, however. The number of goats raised has also declined fairly greatly during the past several years. Today the province has a total of 105,000 head, 40 percent fewer than the 172,000 head of the all-time high year of 1963.

Local rabbit varieties in the province are mostly from Guangfeng, Wanzai, and Xingguo counties, with scattered distribution elsewhere. As a result of the raising of rabbits over a long period of time under the natural and socioeconomic conditions of this province, local breeds tolerate coarse fodder, and are strongly disease-resistant to a greater extent than rabbits from elsewhere. However, since their hair and skin are of poor quality, they are raised mostly by peasant households while collectives and state-owned farms raise mostly angora rabbits.

In order to meet the needs of national economic development and the people's livelihood, it will be necessary to make full and equitable use of the province's natural resources for vigorous revival and development of goat and rabbit production in all jurisdictions, to suit general methods to local circumstances for promotion of fine-haired goats and other superior rabbit breeds that can be used for their hair (and skin) and meat, with the country, collectives and individuals all raising them for greater development of the province's goat- and rabbit-raising industry.

D. The Beekeeping Industry

The beekeeping industry is yet another production project in the province's animal husbandry industry that shows great prospects. It does not compete for land or fertilizer with farm crops, requires little investment, shows quick results, and provides large benefits. Development of beekeeping is an important way in which to make fullest use of the province's natural agricultural resources so that the peasants become rich as quickly as possible. In the counties of the province where beekeeping has developed fairly well, cash earnings have been considerable. Take Gao'an County, for example, which had net earnings of more than 620,000 yuan during 1978 from 105 bee farms, the rate of profit reaching 51 percent. Longtan Production Brigade in Gao'an County had a workforce of 39 males and females in its Longtan Production Team, 2 of whom were assigned to beekeeping. In 1978, earnings from beekeeping amounted to 46 percent of the gross output value of agricultural sideline production for net earnings averaging 382 yuan per household. At the same time, honeybees pollinate farm crops, promoting increased yeilds, so economic value greatly in excess of the honey produced may be derived. Experiments have shown that following honey bee pollination, output from cross pollination of farm crops increases greatly. It increases 12 percent for cotton, for example, between 26 and 30 percent for rape, 43 percent for soybeans, and as much as 170 percent for watermelons. Internationally, numerous countries are now using bees to pollinate farm crops, and this has

become a powerful measure for increasing agricultural yields. Bees have been compared to "agricultural wings." Among the farm crops grown in Jiangxi Province, entomophilous flower plant varieties are very numerous, including crops such as rape, cotton, tangerines and oranges, and green manure crops. Flowers blossom all year round, making for plentiful sources for honey, and a definite basis already exists for development of the beekeeping industry. Today more than 130,000 hives of bees are being kept throughout the province. Nevertheless, quite a few places are still not giving sufficiently serious attention to the development of beekeeping. They have not included in plans the needed hives and beekeeping implements or assured their supply. Technical forces for beekeeping are weak. As a result, bee colonies are small virtually everywhere; they have many diseases, honey output is low and only single species are raised. The present state of beekeeping is very much not in keeping with the outstanding natural conditions that the province provides. It will be necessary to develop the beekeeping industry in the future as a major project in economic diversification and to promote its development.

E. Poultry

Poultry raising also holds an important position in the province. Mostly it is a commune member family sideline occupation. With the post-liberation establishment of agricultural collectivization, both collective and state-owned poultry raising developed, with the raising of chickens and ducks for the most part. Famous chicken species produced in the province include "Wushan chickens," which are also known as "Taihe chickens," and "Wugu chickens," and which are grown in Taihe County and at Xiyan in Wushan. These chickens are very lively, their meat is tender and savory, and they contain amino acids needed by the human body. They also have fairly high value for medicinal purposes. The "black chicken white wind pills" that have these chickens as their principal ingredient are a famed Chinese gynecological medicine. This is a superior local chicken breed used in the province both for medicine and for meat, and it is famed in China and abroad. It is a brisk-selling poultry variety annually supplied for export that earns foreign exchange. Still other chicken varieties prized for both their eggs and meat are Wanzai and Kangle chickens, and Hukou and Gaoqiao chickens are also rather valuable. Chickens aside, among duck varieties sheldrakes are a fast-growing, rapid-fattening, high egg-producing variety. They are superior variety sheldrakes for both meat and eggs from southern Jiangxi. The famed "Nan'an pressed duck" is made from Dayu County sheldrakes. They have a fine appearance, a clear white skin, thin skin and tneder meat, plentiful oil in their tails, brittle and chewy bones, and a fine smell and taste. They enjoy brisk sales in Hong Kong and Macao markets and everywhere in the province as well. Yet another variety is Yichun sheldrakes, which annually lay approximately 250 eggs each. Theduck eggs that Yichun sheldrakes produce are processed into Songhua 1,000-year-old eggs called, "Yuanzhou 1,000-year-old eggs," and which are a local delicacy from Jiangxi Province that sell well both at home and abroad. Additionally,

the large white geese produced in Yushan are a superior variety that are sold in faraway Hong Kong and Macao markets. In order to met future needs, full use will have to be made of the natural conditions that reservoirs, ponds and hay farms provide as well as of experience in raising ducks in all jurisdictions. It will also be necessary to breed and introduce superior poultry varieties and to create conditions actively for development in the direction of mechanized feeding.

7. Fishing Industry Production and Patterns

Jiangxi is known as "the land of fish and rice," and is one of the country's key freshwater fishery provinces. There are countless large and small lakes throughout the province, and the landscape is dotted with reservoirs and ponds. Rivers crisscross it. Collectively, all the water surfaces including Boyang Lake cover a 25 million my area, and more than 4 million mu may be used for the breeding of aquatic products. Artificial breeding is the main thrust of Jiangxi Province's aquatic products industry, output from which amounts to approximately 70 percent of gross output, natural catches accounting for 30 percent. In 1979, the province's breeding area covered 2.57 million mu and output was about 930,000-odd dan, with a group of counties and cities producing yields of more than 100 jin per mu and high-yield models producing more than 1,000 jin per mu. Prefectures having a substantial artificial breeding area include Jiujiang, Shangrao, Yichun and Ganzhou, with Ganzhou and Shangrao prefectures having the greatest output.

Boyang Lake accounts for more than 70 percent of natural catches. As a result of enclosing of lake areas to create fields during the past more than 10 years, an effort that is considered not to have provided sufficient benefits overall, the lake surface has steadily decreased, and the lake bed has become shallow with silt. Incomplete statistics show that of a former 780,000 mu protected-breeding area in the lake, today only 390,000 mu remain. Fine natural fishing grounds have decreased, and the pattern of breeding and living of schools of fish has been broken. Pollution is severe in some lakes and rivers, and improper methods for the eradication of snails have caused damage to fishing industry resources with natural catches declining by more than one-half. In addition, the former annual catches of 200,000 dan of aquatic products from the Yangtze River, which flows through the northern tip of the province, has greatly decreased. Clearly, rational use and protection of aquatic product resources is a problem in urgent need of solution.

With each fishing season along the shores of the Yangtze River in the counties and cities of Jiujiang, Hukou, Ruichang, and Pengze, fish from the lower reaches of the Yangtze swim upstream against the current in a spawning migration. The local fishermen have experience and a tradition in getting hold of the roe for the rearing of fish fry. The bighead carp, silver carp, snail carp, and grass carp fry that they take are provided not only for rearing in the province, but shipped and sold in many provinces and cities. Formerly between 500 and 600 million fry were taken every year, but now the amount has dropped to about 200 million.

The province's output of aquatic products reached a maximum of 720,000 dan before liberation (in 1936). After liberation, it reached 873,500 dan in 1951, breaking the all-time high pre-liberation record. A total of more than 110 state-owned aquatic products enterprises and 1,047 commune and brigade fish farms were established throughout the province one after another, and superior fish species were bred or introduced from elsewhere for the establishment of a group of commodity fish bases. Between 1949 and 1956, speed of growth was faster than for the country as a whole, with an annual incremental increase averaging 5.4 percent. After 1970, annual gross output fluctuated around 1.2 million dan. The past 3 years have seen fairly great revival and development, with gross output of aquatic products for the province as a whole reaching 1,346,000 dan in 1979, a 1.8-fold increase over 1949. Nevertheless, output was still 3 percent less than the 1962 all-time high level of 1,388,000 dan. Formerly Jiangxi Province sold fresh fish in other provinces year after year, but now it must rely on shipments from other provinces each year. The average level of per capita fish consumption for the province (4.2 jin) is only slightly more than one-third the national average (11 jin). That a key fish-producing area in the country should now have serious difficulties in getting fish to eat is a problem deserving serious attention.

In order to meet future needs in building the national economy and improving the people's standard of living, great development must take place in output of the province's fishing industry. Rational readjustment of fishing industry production patterns must take place, with a change away from neglect of the protection of aquatic product resources propagation to vigorous protection and rational use to increase the propagation of resources. A change must be made from primary reliance on natural catches to increase output to primary reliance on breeding to increase output. Sole pursuit of the quantity of output must give way to emphasis on raising the quality of output, and a firm grip must be taken on the following matters:

First is vigorous protection of the breeding of aquatic product resources. Effective management and protection measures must be taken in accordance with the national fishing industry management law, such as establishing prohibited fishing zones and prohibited fishing times as needed for a resolute half to the catastrophic exhaustion of aquatic product resources. At the same time, overall consideration must be given to benefits from the use of large and small lakes including Boyang Lake, and a halt called at once to the unplanned unbridled enclosure and reclamation of the Boyang Lake region in order to insure the revival and development of superior natural fishing grounds. The wisdom and efforts of all should be pooled to solve river and lake pollution problems as quickly as possible.

Second is use of breeding primarily as a means of hastening the building of commodity fishing industry bases. First is the building of centralized continuous tract commodity fishing industry bases centering around 10 counties in the Boyang Lake region, using state-owned enterprises and

collective enterprises in a policy of walking on two legs, suitable expansion of the breeding area, building of consistently high-yield water surfaces, combining intensive and nonintensive rearing, and vigorously increasing breeding yields per unit of area. For the time being, natural catches should be given time to rest and recuperate for the revival and propagation of resources so that catches will gradually increase over the years.

Third is continued major efforts in the rearing of fish in suburbs. While consolidating and upgrading current intensive rearing of fish in ponds, the consistently high-yield area should be actively enlarged. Today there are about 13,000 mu of ponds for the intensive rearing of fish in the province, far from enough to meet demand. Proper expansion should be made from this foundation in order to solve as quickly as possible food fish problems in cities, and in industrial and mining areas.

Fourth, all water surfaces in farflung rural villages should be used to hasten development of commune and brigade rearing of fish. In mountain and hill regions where water surfaces are few, full use should be made of mountain pools and reservoirs for the rearing of fish, and so long as collective production is not harmed, commune members should be encouraged to use mountain pools and small ditches for the rearing of fish. Places having requisite conditions should also encourage the rearing of fish in paddyfields and in net cages, and they should actively develop production of aquatic products such as pearls and red water chestnuts.

8. Commune and Brigade Enterprises and Rural Sideline Occupations

Commune and brigade enterprises are a new endeavor under China's socialist system that holds vast prospects. Not only are they an important integral part of the people's commune collective economy, but they are also demonstrating an increasing role that cannot be ignored in hastening the modernization of agriculture, in narrowing differences between cities and countryside, in improving standards of living of commune members, and in providing the country raw materials and products. While taking a firm grip on grain, cash crop, forestry, animal husbandry and fishing industry production, commune enterprises and rural sideline occupations have been vigorously developed that are better able to use in multiple ways the provinces natural resources, manpower, animal power and production tools, to broaden avenues, and to march forward in depth and in breadth. In recent years commune and brigade enterprises and rural sideline occupation production have both developed substantially. Incomplete statistics show that as of 1979, 99.5 percent of communes and 82 percent of production brigades were operating a total of 40,900 commune and brigade enterprises of different kinds and employing 808,000 people, which was about 9 percent of the total rural people's commune labor force. Commune and brigade enterprises had a gross output value of 1.21 billion yuan, which was 24.4 percent of gross earnings for the people's communes three-tier economy. They provided profits of 165 million yuan for the year. In Pingxiang City, where commune and brigade

enterprises and rural sideline occupations developed fairly rapidly, virtually every commune- and brigade-operated enterprise, and in 1979, the gross output value of commune and brigade enterprises for the city as a whole reached more than 180 million yuan, which was nearly 60 percent of gross earnings of the people's commune three-tier economy. The funds that commune and brigade enterprises provided agriculture equalled nine times the funds for support of agriculture provided by local government financial institutions in the city. They vigorously assisted development of agricultural production and agricultural mechanization, fully demonstrating the role that commune and brigade enterprises play in hastening development of agricultural production.

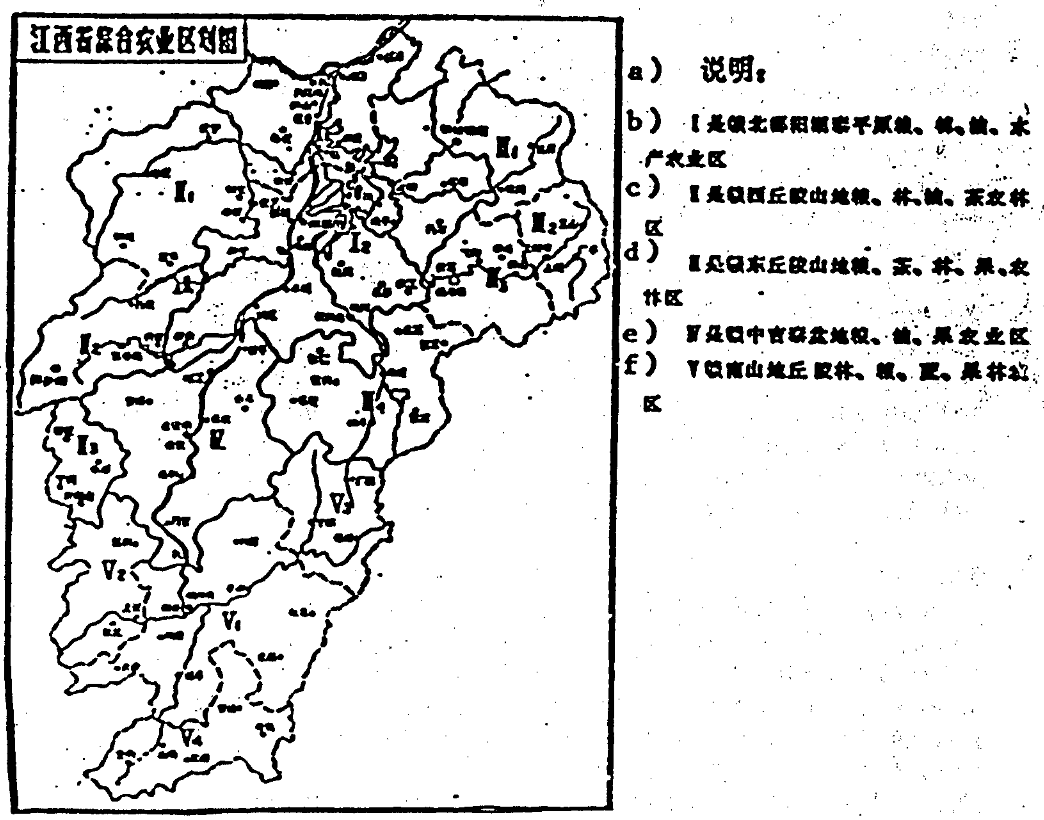
Nevertheless, in an overall sense, the province's commune and brigade enterprises and its rural sideline occupations have not developed fast enough. The gross output value of commune and brigade enterprises in proportion to the three-tier economy of people's communes as a whole is lower than the national average. Enterprises accumulate little and their collective economic foundation is still very weak. In order to hasten development of agriculture and meet needs in the modernization of agriculture, substantial future development will be required.

The province has outstanding natural conditions; resources for development of commune and brigade enterprises and for rural sideline occupations production are extraordinarily plentiful; avenues are broad; and projects are very numerous as, for example, farming and raising of livestock, gathering, processing, catching fish, felling trees, plaiting, etc, which are all that one would expect. Surveys have shown that in southern Jiangxi alone, there are more than 2,000 kinds of wild-growing plants that can be used as raw materials for light industries.

Part II. Agricultural Regions

Agricultural production is analogous to an "open-air workshop" that is deeply affected by natural conditions including terrain, climate, hydrology, and soil, is also limited by varying socioeconomic conditions and technical conditions, and which is strongly regional. "Direction of agriculture entails use of different methods for each different region.[1] Scientific zoning of all types of agricultural regions on the basis of objective laws governing regional distinctions in agricultural production holds major importance in the suiting of general methods to specific circumstances in planning, apportioning, and directing agricultural production.

Map Showing Agricultural Zoning in Jiangxi Province



Key: a) Explanation
b) I is the north Jiangxi-Boyang Lake-Tai Plain grain, cotton, oil, and aquatic products agricultural zone
c) II is the western Jiangxi hill and mountain grain, forest, oil, and tea farming and forestry zone
d) III is the eastern Jiangxi hill and mountain grain, tea, forest, and fruit farming and forestry zone
e) IV is the central Jiangxi Jitai Basin grain, oil, and fruit farming zone
f) V is the southern Jiangxi mountain and hill forest, grain, sugarcane, and fruit forestry and farming zone

1 Mao Zedong, "Issues in Economics and Finance," 1942.

Jiangxi Province is located in China's central subtropical monsoon climate region. It covers about 5° 75' of latitude and 4° 95' longitude, and has a land area of more than 166,600 sq km. Within the province, landforms are complex and natural conditions varied. This, plus the effects of historically long-enduring socioeconomic and technical conditions, has resulted in marked regional differentiation in agricultural production in the north, south, east, west and central parts of the province. The northern region with Boyang Lake at its center is a vast plain in which the river and lake water network is dense, fields are broad and flat, and farming is intensive. Apart from a very small percentage of forestry production, all other kinds of production including farming, animal husbandry, sideline occupations, fisheries, and the growing of grain, cotton and oil-bearing crops is fairly concentrated. Quintessential conditions for development of agriculture for the whole province exist here, and the region is also one of China's major commodity grain bases. The eastern and western hill and mountain regions have a towering terrain, dense forests and prolific timber and bamboo production. It also produces tea, tea oil, fruit and medicinal materials, and the growing of grain and economic diversification is also considerable. In the southern mountains and hills, the climate is almost southern subtropical, and production of timber, sugarcane, tobacco and fruit thrives. Were it possible to do more in the way of water and soil conservation to improve conditions for agricultural production, a tremendous potential could be tapped for farming, forestry, and animal husbandry production. In the central Jitai Basin, both natural conditions and agricultural production may be characterized as transitional. Principal crops include paddy rice, oil-bearing crops, sugarcane, jute and cotton. Though grain output is relatively low, since population is scant relative to available land, the commodity rate is high, and potential is very great. In addition, conditions exist here for the building of a provincial commodity grain base.

General principles arrived at on the basis of the foregoing objectively existing differences in agricultural regions and overall agricultural zoning in the province are as follows: A fundamental similarity in natural, technical and economic conditions for agriculture; relative sameness in agricultural production characteristics, in existing problems, and in the direction of development and measures for major technical transformation; preservation intact of county-level administrative zones while dividing up in outline form the province's different yet geographically contiguous areas into five different primary agricultural regions. These five regions are as follows: (1) the northern Jiangxi Boyang Lake Plain grain, cotton, oil and aquatic products agricultural region; (2) the western Jiangxi hill and mountain grain, forest, oil and tea farming and forest region; (3) the eastern Jiangxi hill and mountain grain, tea, forest and fruit farming and forest region; (4) the central Jiangxi Jitai Basin grain, oil and fruit farming region; and (5) the southern Jiangxi mountain and hill forest, grain, sugarcane, tobacco and fruit tree agricultural region.

An exposition of the agricultural production conditions and characteristics of each of these five agricultural regions, existing problems and measures for their future course, and direction of development is provided below.

Basic Situation in Each Agricultural Region in Jiangxi Province (1979)

江西省各农业区基本情况（1979年）

项目 a)		单位 b)	全省 c)	赣北区 d) 小计 i)	赣北区 占全省 j) %	赣西区 e) 小计 i)	赣西区 占全省 j) %	赣东区 f) 小计 i)	赣东区 占全省 j) %	赣中区 g) 小计 i)	赣中区 占全省 j) %	赣南区 h) 小计 i)	赣南区 占全省 j) %
k) 行政单位		l) 个	91	26	/	16	/	20	/	9	/	20	/
m) 土地面积		n) 万平方公里	16.66	4.08	24.5	2.87	17.2	3.46	20.7	1.87	11.3	4.38	26.3
o) 人口	p) 总人口	q) 万人	3228.98	1213.55	37.6	508.69	15.8	569.81	17.6	269.03	8.3	667.90	20.7
	r) 人口密度	s) 人/平方公里	194	297	/	177	/	165	/	144	/	152	/
	t) 农业人口	q) 万人	2748.36	994.83	36.20	440.29	16.02	473.66	17.23	235.84	8.58	603.74	21.97
	u) 农业劳动力	q) 万人	1015.3	379.7	37.4	150.3	14.8	168.5	16.6	86.3	8.5	230.5	22.7
v) 耕地	w) 耕地面积	x) 万亩	3800	1490	39.22	551	14.49	620	16.32	496	13.04	643	16.93
	y) 水田面积占耕地	%	80.4	74	/	81	/	86	/	85	/	85	/
	z) 农业人口平均耕地	aa) 亩	1.38	1.50	/	1.25	/	1.31	/	2.10	/	1.06	/
	ab) 农业劳动力平均负担耕地	aa) 亩	3.74	3.92	/	3.67	/	3.68	/	5.75	/	2.79	/
	ac) 垦殖指数	%	15.2	24.3	/	12.8	/	12.0	/	17.7	/	9.8	/
	ad) 复种指数	%	225	242	/	227	/	230	/	208	/	194	/
	ae) 粮食作物占用耕地面积	x) 万亩	3112.85	1161.09	37.3	454.48	14.6	541.64	17.4	426.46	13.7	529.18	17.0
af) 现代化水平	ag) 旱涝保收农田面积	x) 万亩	1780.7	727.6	40.9	266.3	14.9	278.5	15.6	164.9	9.3	343.4	19.3
	ah) 其中：稳产高产农田	x) 万亩	1099	456	41.5	157	14.3	185	16.8	80	7.3	221	20.1
	ai) 农业人口平均稳高农田	aa) 亩	0.40	0.46	/	0.36	/	0.39	/	0.34	/	0.37	/

[Key to follow]

续1

项 a) 目			单 b) 位	全 c) 省	赣 d) 北 区		赣 e) 西 区		赣 f) 东 区		赣 g) 中 区		赣 h) 南 区	
					小 i) 计	占全省 j) %	小 i) 计	占全省 j) %	小 i) 计	占全省 j) %	小 i) 计	占全省 j) %	小 i) 计	占全省 j) %
现代化水平 ae)		a k) 机耕面积占耕地	%	26.5	34.1	/	23.8	/	20.8	/	29.1	/	14.9	/
		a l) 每亩耕地施用化肥	a l) 斤	79.5	87	/	88	/	82.3	/	61.5	/	65.8	/
		a m) 每亩耕地用电量	a n) 度	10.4	13.6	/	16.1	/	6.5	/	3.2	/	7.4	/
耕作业 a o)		a q) 农作物总播种面积	x) 万亩	8552.95	3601.54	42.11	1249.18	14.60	1425.82	16.67	1031.15	12.06	1245.26	14.56
	粮食作物 a p)	播 a r) 种面积	x) 万亩	5766	2305	40	863	15	952	16.5	693	12	953	16.5
		粮 a s) 总产量	a t) 亿斤	259.3	101.7	39.2	41.5	16.0	46.8	18.0	26.4	10.2	42.9	16.6
		粮 a u) 食耕地亩产	a l) 斤	833	876	/	913	/	864	/	619	/	811	/
		a v) 农业人口平均产粮	a l) 斤	943	1022	/	943	/	988	/	1119	/	711	/
		征购粮(原粮) a w)	a t) 亿斤	55.8	24.1	43	7.8	14	10.5	19	6.8	12	6.6	12
		a x) 农业人口平均贡献	a l) 斤	203	242	/	177	/	222	/	288	/	109	/
		a y) 水稻占农作物播面	%	59.4	54.2	/	60.6	/	61.2	/	62.2	/	68.8	/
	经济作物 a z)	b a) 经济作物播种面积	x) 万亩	707.8	421.3	60	64.1	9	71.5	10	73.3	10	77.6	11
		b b) 经济作物占农作物总播面	%	8.3	11.7	/	5.1	/	5.0	/	7.1	/	6.2	/
		棉花 b c) a r) 播种面积	x) 万亩	152.1	132.6	87	3.2	2	7.8	5	6.2	4	2.3	2
		棉花 b c) b d) 总产量	x) 万担	87.08	80.09	92.0	1.13	1.2	2.76	3.2	2.25	2.6	0.85	1.0
		油 b e) 料 a r) 播种面积	x) 万亩	321.13	164.82	51.4	43.69	13.6	46.17	14.4	44.15	13.7	22.30	6.9

[Key to follow]

续 2

项 a) 目				单 b) 位	全 c) 省	赣 d) 北 区		赣 e) 西 区		赣 f) 东 区		赣 g) 中 区		赣 h) 南 区	
						小 i) 计	占全省 j) %	小 i) 计	占全省 j) %	小 i) 计	占全省 j) %	小 i) 计	占全省 j) %	小 i) 计	占全省 j) %
耕作业	az) 经济作物	油 be) 菜	总产量 bd)	万担 x)	201.27	109.10	54.2	33.30	16.5	27.99	13.9	18.81	9.4	12.07	6.0
		bf) 花生	播种面积 ar)	万亩 x)	69.58	25.75	37.0	6.41	9.2	3.31	4.8	7.43	10.7	26.68	38.3
			总产量 bd)	万担 x)	121.18	39.71	32.8	8.88	7.3	4.56	3.8	9.35	7.7	58.68	48.4
		bg) 芝麻	播种面积 ar)	万亩 x)	103.93	83.33	80.2	2.89	2.8	6.94	6.7	10.00	9.6	0.77	0.7
			总产量 bd)	万担 x)	75.98	61.96	81.5	2.20	2.9	4.69	6.2	6.52	8.6	0.61	0.8
		bh) 黄麻	播种面积 ar)	万亩 x)	7.75	2.85	36.8	0.10	1.3	1.53	19.7	1.70	21.9	1.57	20.3
			总产量 bd)	万担 x)	30.12	12.58	41.8	0.23	0.8	7.0	23.2	4.57	15.2	5.74	19.0
		bi) 苎麻	播种面积 ar)	万亩 x)	2.12	1.27	59.9	0.57	26.9	0.15	7.0	0.05	2.4	0.08	3.8
			总产量 bd)	万担 x)	2.42	1.60	66.1	0.54	22.3	0.17	7.0	0.05	2.1	0.06	2.5
		bj) 甘蔗	播种面积 ar)	万亩 x)	28.20	5.04	17.9	0.43	1.5	3.25	11.5	2.56	9.1	16.92	60.0
			总产量 bd)	万担 x)	1581.57	229.15	14.5	14.84	0.9	165.23	10.4	129.47	8.3	1042.88	65.9
		bk) 烤烟	播种面积 ar)	万亩 x)	3.18	0.25	7.9	/	/	0.02	0.6	0.15	4.7	2.76	86.8
			总产量 bd)	万担 x)	3.45	0.23	6.7	/	/	0.02	0.5	0.11	3.2	3.09	89.6
		bl) 晒烟	播种面积 ar)	万亩 x)	5.69	0.40	7.0	1.25	22.0	1.33	23.4	0.32	5.6	2.39	42.0
			总产量 bd)	万担 x)	6.53	0.61	9.3	1.07	16.4	1.82	27.9	0.28	4.3	2.75	42.1

[Key to follow]

续 3

项 a) 目				单位 b)	全 c) 省	赣 d) 北 区		赣 e) 西 区		赣 f) 东 区		赣 g) 中 区		赣 h) 南 区	
						小计 i)	占全省% j)	小计 i)	占全省% j)	小计 i)	占全省% j)	小计 i)	占全省% j)	小计 i)	占全省% j)
bm) 林	bn) 有林地		面 bo) 积	万公顷 bp)	609.9	71.0	11.6	128.6	21.1	133.6	21.9	67.7	11.1	209.0	34.3
			bq) 占土地面积	%	36.58	17.50	/	44.62	/	38.66	/	34.83	/	47.86	/
	br) 活立木蓄积量			bs) 万立方米	26253.3	1028.5	3.92	5818.9	22.16	7124.1	27.13	3052.0	11.63	3229.8	35.16
	bt) 经济林		bu) 油茶面积	x) 万亩	1336.5	133.9	10.0	396.0	29.6	229.2	17.2	162.4	12.2	415.0	31.0
		bv) 茶叶	面 bo) 积	x) 万亩	89.92	17.02	18.9	20.48	22.8	37.54	41.7	1.95	2.2	12.93	14.4
			产 bw) 量	b) 万担	18.40	2.73	14.8	3.59	19.5	10.26	55.8	0.31	1.7	1.51	8.2
业		by) 柑桔	面 bo) 积	x) 万亩	20.99	7.09	33.8	3.36	16.0	4.64	22.1	2.69	12.8	3.21	15.3
			产 bw) 量	c) 万担	65.60	13.59	20.7	1.95	3.0	14.35	21.9	24.29	37.0	11.42	17.4
bz) 畜牧业	ca) 役牛		头 cb) 数	x) 万头	160.76	58.32	36.3	23.68	14.7	23.80	14.8	22.49	14.0	32.47	20.2
			平均负担耕 cd) 地	ce) 亩/头	23.6	25.5	/	23.3	/	26.1	/	22.1	/	19.8	/
	cf) 生猪		存栏数 cg)	x) 万头	1004.66	390.89	38.9	176.26	17.6	176.90	17.6	97.61	9.7	163.00	16.2
			每亩耕地头 ch) 数	ce) 头	0.26	0.26	/	0.32	/	0.29	/	0.20	/	0.25	/
ci) 水产品产量				b) 万担	134.60	77.81	57.8	10.77	8.0	16.67	12.4	9.39	7.0	19.96	14.8

cj) 说明：1.全省91个行政单位包括3个省辖市、1个山、7个地辖市和80个县。2.土地面积由省测绘局提供。3.油茶面积、有林地面积和活立木蓄积量是根据江西省农林垦殖设计院1976年编《江西省森林资源汇总表》计算。4.粮食征购量由省粮食厅提供。5.耕地面积由省统计局提供。6.其余资料均按省农业厅提供的各地年报数计算的。

[Key to follow]

[Key to tables on previous four pages]

Key:
a) Particulars
b) Units
c) Whole province
d) Northern Jiangxi region
e) Western Jiangxi region
f) Eastern Jiangxi region
g) Central Jiangxi region
h) Southern Jiangxi region
i) Subtotal
j) Percent of whole province %
k) Administrative units
l) Each
m) Land area
n) 10,000 sq km
o) Population
p) Total population
q) 10,000 persons
r) Population density
s) Persons per sq km
t) Agricultural population
u) Agricultural labor force
v) Cultivated land
w) Cultivated land area
x) 10,000 mu
y) Percent of cultivated land that is wetland area
z) Average amount of cultivated land per capita of agricultural population
aa) Mu
ab) Average amount of cultivated land for which agricultural labor force is responsible
ac) Cultivation index
ad) Multiple-cropping index
ae) Cultivated land area used for food crops
af) Level of modernization
ag) Farmland area able to guarantee a harvest despite drought or waterlogging
ah) Including: consistently high-yield farmland
ai) Average amount of consistently high-yield farmland per capita of agricultural population
aj) Percent of cultivated land area that is machine-plowed
ak) Amount of chemical fertilizer used per mu of cultivated land
al) Jin
am) Amount of electricity used per mu of cultivated land
an) kWh
ao) Farming operations
ap) Grain crops
aq) Total area sown to farm crops
ar) Area sown

[Key continued from previous page]

as) Gross output of grain and beans
at) 100 million jin
au) Grain yields per unit of cultivated land
av) Average grain yields per capita of agricultural population
aw) State grain procurement (unprocessed food grain)
ax) Average contribution per capita of agricultural population
ay) Paddy rice as a percentage of area sown to crops
az) Cash crops
ba) Area sown to cash crops
bb) Cash crops as a percentage of total area sown
bc) Cotton
bd) Gross output
be) Rape
bf) Peanuts
bg) Sesame
bh) Jute
bi) Ramie
bj) Sugarcane
bk) Flue-cured tobacco
bl) Sun-cured tobacco
bm) Forestry
bn) Forested area
bo) Area
bp) 10,000 hectares
bq) Percentage of land area
br) Live timber reserves
bs) 10,000 m^3
bt) Economic forests
bu) Tea oil area
bv) Tea
bw) Output
bx) 10,000 dan
by) Oranges and tangerines
bz) Animal husbandry
ca) Draft oxen
cb) Number of head
cc) 10,000 head
cd) Average amount of cultivated land served
ce) Head
cf) Live hogs
cg) Number in inventory
ch) Number of head per mu of cultivated land
ci) Aquatic products output
cj) Explanation: 1. The 91 administrative units throughout the province include three cities directly under provincial administration, 1 mountain, 7 cities directly under prefecture administration, and 80 counties. 2. Land area data provided by Provincial Cartographic Bureau. 3. Rape area, forested area and timber serves have been figured from "Aggregate Table

[Key continued from previous page]

of Jiangxi Provincial Forestry Resources," published in 1976 by the Jiangxi Provincial Agricultural and Forestry Reclamation Design Institute. 4. Figures on state grain procurement have been provided by the Provincial Department of Grain. 5. The amount of cultivated land area has been provided by the Provincial Statistical Bureau. 6. All other data have been calculated from figures appearing in annual reports provided by the Provincial Department of Agriculture.

Chapter 3. Northern Jiangxi Boyang Plain Grain, Cotton, Oil-bearing Crops, and Aquatic Products Agricultural Region

The northern Jiangxi Boyang Lake Plain grain, cotton, oil-bearing crops, and aquatic products agricultural region is the largest and most important of the province's agricultural regions. It is the champion among all agricultural regions in its output of grain, cotton, oil, livestock, and aquatic products, particularly in the large quantity of marketable grain it provides, which amounts to approximately 43 percent of the total for the province as a whole. The Boyang Lake Commodity Grain Base, which is one of the country's key commodity grain bases, is located in this agricultural region.

This agricultural region is located in the northern part of the province. It is broad in scope, covers a large area, and has a large population. Administratively it includes Jiujiang City plus Jiujiang, Hukou, Pengze, Duchang, Xingzi, Ruichang, De'an, and Yongxiu counties in the Jiujiang Special District; Boyang, Leping, Yugan, Wannian and Yujiang counties in the Shangrao Special District; Jinxian, Dongxiang and Linchuan counties, plus Fuzhou City in the Fuzhou Special District; Anyi, Gao'an Fengcheng, Qingjiang and Xinyu counties in the Yichun Special District; plus Nanchang and Xinjiang counties, which are under the jurisdiction of Nanchang City, as are the suburbs of Nanchang, for a total of 26 administrative units. In 1979, this region totaled 40,800 sq km in land area, which was 24.5 percent of the total land area of the whole province. It had 14.9 million mu of cultivated land, which was 39 percent of the whole province's total cultivated land; and it had more than 12.13 million population, or 37.6 percent of the total population in the whole province. This included an agricultural population of 9.95 million, which was 36 percent of the agricultural population in the whole province. It is an agricultural region of the province with a relatively high reclamation and cultivation index and a relatively well-developed agricultural economy. In 1979, it accounted for 39 percent and 92 percent, respectively, of the whole province's gross output of grain and cotton. It also produced a relatively large percentage of the province's output of fats and oils, live hogs in inventory, and aquatic products, accounting for 38, 39 and 58 percent, respectively, of the whole province's output of these products, fully demonstrating the important position of this region in the agricultural production of the whole province.

First Section. Agricultural Production Conditions

1. Plains and Low Hills Widely Distributed; Water and Soil Resources Plentiful

This agricultural region is located at the bottom of a provincewide baseinlike topography in which the terrain is high all around and low in the middle, high in the south and low in the north, and opens northward. The topography is mostly plain followed by low hills and downlands and having relatively few mountains. The plains are (including water

surfaces and some downlands) amounts to approximately 65 percent of the total area of the region and to more than 73 percent of all terrain of the same kind in the province. It is the bulk of this region's agricultural terrain. The hill area is 20 percent, most of which is covered with red earth. The mountain area is 7 percent, and most of it is found around the fringes of this region (See Table 3-1).

Plains and downlands: This region has a plains area of almost 10,000 sq km, which is almost 80 percent of the province's total plains area. In addition to the broad area of the Boyang Lake Plain, river valley plains are widely found on both shores of the middle and lower reaches of the five rivers, the Gan, Fu, Xin, Rao and Xiu. These valleys are about 1,000 m wide [as published] and have a relative difference in elevation of less than 10 m. They are the region's principal cultivated land areas. Downlands, most of which are between 70 and 140 m above sea level, and which have a relative difference in elevation of between 30 and 80 m and a slope of between 10 and 20 degrees, are also widely found on both sides of the five-river system where the terrain is moderately rolling with downlands interspersed. Since water conservancy conditions are poorly developed here, agricultural production is prone to drought impairment.

Hills and mountainlands: This region has a relatively small hill and mountain area, the total covering approximately 14,200 sq km [as published], or only 10.9 percent of the province's total hill and mountain area. Most are found around the fringes of the region. Hi-ls are generally between 300 and 500 m above sea level with a relative elevation ranging from 50 to 300 m and a 15-30 degree slope covered with masson pine, bushes and subtropical grass. Ridged fields and riverbank fields are the main kinds of farmland in the hill region. Except for Lu Shan, Yuhua Shan (the mountain that forms the dividing line between Qingjiang, Fengcheng, and Xin'gan counties), Yun Feng (the mountain that forms the dividing line between Xinyu and Shanggao), and Sanxian Ling (the mountain that divides Wannian, Guixi and Yiyang), most of the mountains are about 500 m above sea level. The farmland area is relatively small, and timber and bamboo resources are relatively large.

This region's terrain pattern, type, composition and characteristics have a marked effect on the climate, rivers, hydrology and soil distribution. This is reflected in land utilization, which has the following outstanding characteristics:

Table 3-1. Terrain Breakdown Statistics For Each County in the Boyang Lake Plain Agricultural Area in Northern Jiangxi

	a) 县、市	土地面积 b) (平方公里)	山 c) 地		丘 d) 陵				平原（包括水面和部分岗地）e)	
			面 f) 积	占土地面积% g)	高丘面积 h)	占土地面积% g)	低丘面积 i)	占土地面积% g)	面 f) 积	占土地面积% g)
j)	全区合计	40790.0	2686.0	7.0	3399.4	8.3	8140.6	20.0	26564.0	65.0
k)	北部副区	10819.0	1327.0	12.0	1649.2	15.2	2002.8	18.5	5840.0	54.0
l)	九江市	638.0	140.0	22.0	／	／	／	／	498.0	78.0
m)	九　江	873.0	44.0	5.0	144.0	16.5	135.0	15.5	550.0	63.0
n)	湖　口	666.0	／	／	66.7	10.0	80.3	12.1	519.0	78.0
o)	彭　泽	1544.0	93.0	6.0	264.0	17.1	570.0	36.9	617.0	40.0
p)	都　昌	1989.0	／	／	223.6	11.2	512.4	25.8	1253.0	63.0
q)	星　子	724.0	109.0	15.0	28.3	3.9	22.7	3.1	564.0	78.0
r)	瑞　昌	1423.0	526.0	37.0	572.0	40.2	83.0	5.8	242.0	17.0
s)	德　安	927.0	130.0	14.0	133.0	14.3	451.0	48.7	213.0	23.0
t)	永　修	2035.0	285.0	14.0	217.6	10.7	148.4	7.3	1384.0	68.0
u)	南部副区	29971.0	1359.0	5.0	1750.2	5.8	6137.8	20.5	20724.0	69.0
v)	波　阳	4454.0	223.0	5.0	280.3	6.3	1278.7	28.7	2672.0	60.0
w)	乐　平	1971.0	39.0	2.0	360.7	18.3	703.3	35.7	868.0	44.0
x)	余　干	2331.0	／	／	16.0	0.7	240.0	10.3	2075.0	89.0
y)	万　年	1144.0	69.0	6.0	218.4	19.1	456.6	40.0	400.0	35.0
z)	余　江	927.0	／	／	38.8	4.2	341.2	36.8	547.0	59.0
aa)	南昌市	446.0	232.0	52.0	／	／	／	／	214.0	48.0
ab)	南　昌	1907.0	／	／	／	／	19.0	1.0	1888.0	99.0
ac)	新　建	2438.0	122.0	5.0	／	／	24.0	1.0	2292.0	94.0
ad)	安　义	659.0	72.0	11.0	51.4	7.8	40.6	6.2	495.0	75.0
ae)	高　安	2438.0	171.0	7.0	169.9	7.0	488.1	20.0	1609.0	66.0
af)	丰　城	2845.0	228.0	8.0	197.7	6.9	570.3	20.0	1849.0	65.0
ag)	清　江	1287.0	90.0	7.0	／	／	26.0	2.0	1171.0	91.0
ah)	新　余	1776.0	53.0	3.0	186.7	10.5	719.3	40.5	817.0	46.0

[Table 3-1, continued]

县、市	土地面积 (平方公里)	山地 面积	山地 占土地面积%	丘陵 高丘面积	丘陵 占土地面积%	丘陵 低丘面积	丘陵 占土地面积%	平原（包括水面和部分岗地） 面积	平原 占土地面积%
ai) 进贤	1952.0	/	/	/	/	117.0	6.0	1835.0	94.0
aj) 东乡	1275.0	/	/	100.3	7.9	626.7	49.2	548.0	43.0
ak) 临川	1990.0	60.0	3.0	130.0	6.5	487.0	24.5	1313.0	66.0
al) 抚州市	131.0	/	/	/	/	/	/	131.0	100.0

am) 资料来源：土地面积由省测绘局提供；山地、丘陵、平原面积系根据省地质局1975年编制的1/50万《江西省地貌图》量称求得。以下各区类同。

Key:
a) County or city
b) Land area (sq km)
c) Mountainlands
d) Hills
e) Plains (including water surfaces and some downlands)
f) Area
g) Percent of land area
h) High hill area
i) Low hill area
j) Region total
k) Northern subregion
l) Jiujiang City
m) Jiujiang
n) Hukou
o) Pengze
p) Duchang
q) Xingzi
r) Ruichang
s) De'an
t) Yongxiu
u) Southern subregion
v) Boyang
w) Leping
x) Yugan
y) Wannian
z) Yujiang
aa) Nanchang City
ab) Nanchang
ac) Xinjian
ad) Anyi
ae) Gao'an

[Key for table 3-1, continued]

af) Fengcheng
ag) Qingjiang
ah) Xinyu
ai) Jinxian
aj) Dongxiang
ak) Linchuan
al) Fuzhou City
am) Source of data: Land area provided by Provincial Cartographic Bureau; mountainland, hill, and plains area based on "Topographic Maps of Jiangxi Province," 1:500,000, 1975, Provincial Geology Bureau. The same applies to all regions hereinafter.

First, cultivated land is in continuous tracts, and the reclamation and cultivation index is high. The topography of this region, which is dominated by plains and low hills, provides natural conditions for centralized, continuous tracts of cultivated land. This is particularly true of the Boyang Lake Plain, where the terrain is flat, and on the partially formed deltas where the five rivers empty into the lake, including the delta in the lower reaches of the Gan and Fu rivers where the terrain is even flatter, where most of the cultivated land is in continuous tracts, mostly larger than 100,000 mu in area, and some as much as 1 million mu in area. This is extremely favorable for the building of garden-style fields, and for large-scale mechanized operations. Since very early times the working people have plowed and planted this fertile land and developed agricultural production. Today the entire region's reclamation and cultivation index is 24 percent.

Second, wetlands predominate, drylands forming only a small percentage. Since this region's plains are vast and its climate warm and moist, and since it is located in the lower reaches of the five rivers, water is plentiful. This accounts for the predominance of wetlands in the region. According to 1979 statistics, 74 percent of the region's cultivated land was wetlands; however, because of the widespread low hills and downlands, fairly poor water conservancy conditions, and the large percentage of cash crops grown, there is also a certain percentage of drylands, or 26 percent of the total, which is higher than the average for the province as a whole. In wetland areas, the growing of two crops of paddy predominates in a farming system that is mostly green manure-paddy-paddy. In places with a dense population where the burden on the work force is light (mostly in Jiujiang Prefecture and closein suburbs in the northern part of the region), a three-crop system of oil-bearing crop-paddy-paddy, or wheat-paddy-paddy has also spread. Most drylands grow cash crops, principally cotton, peanuts, sesame, hemp and sugarcane. In 1979, the area growing cash crops accounte d for 11.7 percent of the total area sown to crops, or approximately 60 percent of the area sown to cash crops in the whole province. This is a major feature of the region distinguishing its agricultural production from that of other regions.

Third, the types of soil are diverse; the fields are fairly fertile, and potential for use is great. The soil types of this region are complex and varied. Virtually all of the soil types in the province are found in this region. On the lake plain and in river valley plains are found extremely fertile lacustrine accumulations and alluvium. In hill and downland areas, red earth is extremely widespread, and a definite vertical zonal distribution of red earth is found in medium and low mountains. In Lu Shan, for example, the pattern of soil distribution is red earth-reddish yellow earth-mountainland red earth-mountainland yellowish brown earth-southern mountainland meadow soil. This region has a welter of cultivated soil types. If classified in terms of wet and dry, they may be classified in two broad categories as paddy soils and dryland soils (including plains drylands and hill drylands). Paddy soil is the region's most cultivated soil. This region has a long history in the development of agriculture; farming is done more meticulously here than in any of the other regions; the amount of fertilization is high, and thus the degree of soil maturation and soil fertility are relatively high. Take, for example, Yujiang County, in which a soil survey was conducted, and for which the principal cultivated soil types, their nutrients and fertility are shown in Table 3-2.

It must be pointed out that an appreciable area of low-yield fields among this region's wetland soils is in need of improvement. Of these, the low-yield red earth field area is the largest. Found in ridged fields and river bank fields over a wide area in hill regions, and in level fields near the bottom of hills, this is the low-yield soil requiring most improvement. In addition, the sedimentation fields found on both sides of rivers are low in organic content and lacking in nutrients; they are prone to loss of water and fertilizer. The low-yield cold water-logged fields found in hills and mountains among the ridged fields and sunken fields must be improved by suiting general methods to local circumstances.

Soil is the most fundamental means of agricultural production. Soil resources and how they are used are important indicators reflecting agriculture's production potential. This region's soil resources are fairly plentiful. In addition to those that have already been developed for use, the region has an additional nearly 2 million mu of wastelands, most of which have a slope of under 10 degrees and that hold tremendous potential for development of farming, forestry, animal husbandry, and sideline occupations. This region's multiple-cropping index averages 242 percent (including green manure), and though this is higher than the average for the province as a whole, a very great potential still remains to be tapped.

Table 3-2 Yujiang County Major Cultivated Soil Nutrient Levels

表3—2　　余江县主要耕作土壤养分等级情况

a) 土壤类别与名称			1 耕作层深度b)(cm)	2 母　c)质	3 PH值 d)	4 e) 有机质(%)	5 f) 水解氮(ppm)	6 g) 硝态氮(ppm)	7 h) 速效磷(ppm)	8 i) 速效钾(ppm)	9 j) 肥力评价	10 k) 土壤剖面位置
1) 水稻土	m) 冲积性水稻土	n) 乌泥田	0—20	ae) 冲积物	6.5	1.6	100	/	36	45	高	余江云峰公社流源大队 aj)
		o) 乌沙田	0—16	〃	6	1.2	100	/	36	80	高	余江马荃公社岩前大队 aj)
		p) 沙泥田	0—15	〃	6	1.6	100	/	24	45	中偏高	余江邓埠公社良种场 ak)
		q) 沙土田	0—13	〃	6	0.8	50	/	36	30	低	余江马荃公社杨柳大队 al)
		r) 沙田	0—14	〃	5	0.8	75	/	42	15	低	余江 am)
	s) [illegible]壤性水稻土	t) 黄泥田	0—16	af) 第四纪红土	5	2.0	25	/	36	45	低	余江杨溪公社璜源大队 an)
		u) 鳝泥田	0—14	ag) 谷底冲积物	4.5	1.2	75	/	42	45	低	余江红色公社大桥大队 ao)
		v) 火[illegible]田	0—12	〃	5	1.6	25	/	48	80	低	余江杨溪公社杨溪大队 ap)
	w) 冷浸性水稻土	x) 锈水田	0—11	af) 第四纪红土	4.5	1.2	75	/	24	60	低	余江红色公社大桥大队 ao)
		y) 冷浆田	0—14	ag) 谷底冲积物	4.5	1.2	75	/	45	40	低	余江红色公社画桥大队 aq)
		z) 深脚田	0—33	〃	7	1.6	100	/	48	60	有效肥分　低	余江红色公社王坊大队 ar)
aa) 冲积土	aa) 冲积土	aaa) 沙泥土	0—14	ae) 冲积物	5.6	0.5	/	50	10	60	中上	余江 am)
		ac) 砂土	0—10	〃	5.3	0.3	/	30	7.5	60	低	〃
ab) 土	红壤	ad) 红土	0—12	ah) 红粘土或红色风化物	5.4	0.3	/	30	7.5	40	低	〃

as) 资料来源：根据1976年12月《余江县土壤普查资料》整理汇编

Key:
- a) Soil type and name
- b) Depth of cultivated layer (cm)
- c) Mother material
- d) pH value
- e) Organic matter (%)
- f) Hydrolyzed nitrogen (ppm)
- g) Nitrate state nitrogen
- h) Quick-acting phosphate
- i) Quick-acting potash
- j) Assessment of fertility
- k) Sectional location of soil
- l) Paddy soil
- m) Alluvial paddy soil
- n) Black clayey fields

[Key for Table 3-2, continued]

o) Black sandy fields
p) Sandy clay fields
q) Sandy loam fields
r) Sandy fields
s) Red earth paddy soil
t) Yellow clay fields
u) Shanni [7668 3136] fields
v) Fire clay fields
w) Cold waterlogged paddy soil
x) Rusty water fields
y) Cold pasty fields
z) Shenjiao [3088 5183] fields
aa) Alluvial soil aaa) Sandy clay soil
ab) Red earth
ac) Gravelly soil
ad) Red soil
ae) Alluvium
af) Quarternary red soil
ag) Valley bottom alluvium
ah) Red clay or red weathered material
ai) Liuyuan Production Brigade, Yunfeng Commune, Yujiang
aj) Yanqian Production Brigade, Maquan Commune, Yujiang
ak) Dengfu Commune Superior Breed Farm, Yujiang
al) Yangliu Production Brigade, Maquan Commune, Yujiang
am) Yujiang
an) Huangyuan Production Brigade, Jangqi Commune, Yujiang
ao) Daqiao Production Brigade, Hongse Commune, Yujiang
ap) Yangqi Production Brigade, Yangqi Commune, Yujiang
aq) Huaqiao Production Brigade, Hongse Commune, Yujiang
ar) Wangfang Production Brigade, Hongse Commune, Yujiang
as) Source of data: Based on a compilation from "Yujiang County Soil Survey Data," December 1976.

2. Light and Heat Conditions Superior; Summer Flooding and Autumn Drought Relatively Frequent

This region's geographical position and topography cause chilly springs, hot summers, brisk autumns and cold winters. Much rain falls in late spring and early summer; drought occurs in midautumn; the frost-free season is long; total accumulated temperature is high, and rainfall is plentiful. These climatic conditions favor growth of all kinds of farm crops, particularly the growing of heat-loving crops such as paddy rice and cotton.

A. Sunshine is ample, and heat energy abundant. This region has the most superior sunlight conditions of any agricultural region in the whole province, sunshine amounting to between 1,894 and 2,085 hours, a 43-47 percent rate of sunny days. The largest number of sunny days occur in the northern part of Boyang Lake, which receives 1,900-2,085 hours, a 45-47 percent rate of sunny days. This is sufficient to meet needs for the growing of two crops of paddy or cotton (See Table 3-3).

Table 3-3. Statistical Climatic Data on Representative Counties in the Northern Jiangxi Agricultural Region

赣北农业区代表县气候资料统计

表3—3

单位：℃，毫米，小时，天

代表县 a)	平均气温 b)			极端气温 c)		10℃积温 d)			年平均降水量 e)	日照时数 f)	无霜期 g)
	年温 h)	一月 i)	七月 j)	最高 k)	最低 l)	初日 m)	终日 n)	积温 o)			
p) 彭泽	16.6	3.6	28.9	40.0	-18.9	26/3	19/11	5302	1351	2055	247
q) 九江	17.1	4.3	29.5	40.2	-9.7	25/3	20/11	5429	1370	1898	266
r) 都昌	17.2	4.4	29.4	40.5	-10.2	24/3	20/11	5460	1388	2085	260
s) 波阳	17.6	5.0	29.4	39.7	-8.2	22/3	18/11	5587	1590	2063	275
t) 永修	17.0	4.4	29.0	39.5	-11.9	24/3	22/11	5372	1497	1928	261
u) 南昌	17.6	5.0	29.6	40.6	-9.3	22/3	22/11	5579	1522	1895	280
v) 万年	17.7	5.0	29.5	40.0	-8.5	21/3	21/11	5611	1777	1895	264
w) 清江	17.6	5.0	29.4	40.9	-11.7	23/3	20/11	5569	1575	1894	273

Units: °C
mm
Hours
Days

Key:
a) Representative county
b) Average temperature
c) Temperature extremes
d) Cumulative temperatures of 10°C or higher
e) Average annual rainfall
f) Hours of sunshine
g) Frost-free period
h) Annual temperature
i) January
j) July
k) Maximum
l) Minimum
m) First day
n) Final day
o) Cumulative temperature
p) Pengze
q) Jiujiang
r) Duchang
s) Boyang
t) Yongxiu
u) Nanchang
v) Wannian
w) Qingjiang

B. Cold winters, hot summers and high total cumulative temperature. This region's temperature averages 16.6°-18.0°C. During Jaunary, the coldest month, the temperature averages 3.6°-5.5°C. During the hottest months of July and August, the average temperature is about 29°C. The overall trend is for temperatures to be higher in the south than in the north. Since this region's terrain is flat, cold waves can push right on through it; consequently winters are cold, lowest temperatures being -8.2° to -18.9°C, with great variation between south and north. Highest summer temperature ranges from 39.7° to 41.2°C, with little difference between south and north. This region has between 237 and 249 days when temperature is stable at 10°C or above, and during which cumulative temperature ranges from 5,302° to 5,611°C, which is higher than in neighboring agricultural regions at the same latitude. Clearly, this region has extremely copious heat resources that are extremely favorable for the growing of heat-loving crops such as double crops of paddy and cotton. Nevertheless, it is necessary to suit general methods to specific circumstances, match varieties rationally and reduce agricultural consumption in order to make fullest use of this region's heat resources, and to consolidate and develop further this region's agricultural production in which the growing of two crops of paddy predominates.

C. Fairly copious rainfall that is seasonally uneven in distribution. Annual rainfall amounts to between 1,370 and 1,777 mm, with the amount tending to be somewhat scant in Pengze, De'an, Jiujiang, and Hukou counties in the northern part of the region. Though this region is one of relatively scant rainfall in the province, nevertheless, the amount is ample. In addition, surface runoff is particularly plentiful, so there is more than enough water for agricultural irrigation. However, during the early paddy-growing period, flooding and waterlogging of lowlying plains areas along rivers occurs as a result of the concentration of rainfall during that time. During the late paddy-growing period, however, hill regions are prone to autumn drought as a result of the large number of clear days without rainfall. Consequently, in view of different conditions in various places, an important key in development of this region's agricultural production lies in how to suit general methods to specific circumstances to expand water-storage capacity, to regulate surplus and shortage of water at specific times and places, and to make fullest use of the copious water resources.

Though climatic conditions for agricultural production in this region are relatively superior, fairly serious natural calamities such as the early arrival of low temperatures with frost and freezing, flooding, and drought threaten agricultural production.

1. Spring cold: Between mid-February and mid-April virtually every year, this region has a period of low temperatures with overcast and rainy weather that lasts for a minimum of 10 to 20 days, and more than 30 days in some years. Usually this occurs before 15 March. Furthermore, it is around the vernal equinox when the very busy season occurs in the large-scale sowing and propagation of early rice. In some years, however, such as from 28 March to 8 April 1972, a serious "return of cold in spring" occurs, when rotting of seeds and seedlings occurs for between 10 and 20 percent of the rice sown.

2. Flooding and waterlogging: Waterlogging poses the major threat in this region, particularly in the Boyang Lake Plain area where rainfall is overconcentrated between April and June. After the five rivers, the Gan, Fu, Xin, Rao, and Xiu enter this region, waterlogging disasters are extremely likely to occur because of the flat topography, and the silting that has raised the height of river beds making discharge of water very difficult. In 1949, 1954, 1962, 1967, 1970 and 1973, for example, flood and waterlogging disasters were fairly serious. In 1954 and 1962, the stricken area was large; the rainy season lasted a long time, and a large amount of rain fell, all of which were a rarity in the more than 30 years since liberation. Because of the effects on Boyang Lake of high water in the Yangtze River during July and August, the rivers become reverse siphons and flooding and waterlogging can occur around the shores of Boyang Lake.

3. Midautumn drought: Between July and September each year, the amount of rainfall decreases greatly. High temperatures, the intense heat of summer, and the large amount of evaporation make this the time when the late paddy crop and cotton need the most water. In the hills and downlands where water-storage conditions are poor, in particular, midautumn drought is particularly prominent. The droughts of 1963 and 1978, for example, lasted a long time; little rain fell, and the wide area of occurrence was such as has been rare for the past several decades. Thus, comprehensive tackling of Boyang Lake is an important way in which to effect a basic solution to the problem of drought and waterlogging disasters in this region. At the same time, wetland and dryland crops should be rotated, and in places prone to drought where water conservancy facilities are fairly poor, consideration should be given to the growing of soybeans, yellow corn, or sweet potatoes as dryland fall crops in order to avoid drought disasters.

4. Low autumn temperatures: Low autumn temperature usually occur in this region between 30 September and 6 October. In some years, they occur during the early part of late September. In late September 1965, for example, a powerful cold air mass moved southward sending temperatures plummeting to the accompainment of high winds and rain. In Nanchang County alone, the late-paddy empty-glume rate reached between 10 and 20 percent, and was higher than 30 percent in some places. For some late-ripening varieties, the harvest aborted entirely, and the county's grain losses reached 100 million jin.

3. Relatively Good Basis for Modernization of Agriculture Though Current Level Is Still Not High

A. Farmland capital construction is on a preliminary scale. Since liberation, the building of water conservancy in this region has developed greatly. As of 1979, the whole region had more than 1 million horsepower for use in agricultural drainage and irrigation, and the effectively irrigated area increased to more than 10 million mu. This included 7.27 million mu from which a crop could be assured despite drought or waterlogging, and farmland producing consistently high yields reached 4.5

million mu. This was 49 and 30 percent, respectively, of the region's total cultivated land area. Development of water conservancy has played an extremely important rôle in reducing flooding and waterlogging around the lake and in the lower reaches of the five rivers, in reducing flood and drought disasters in plains areas and drought disasters in downlands and hill regions, and in improving low-yield red earth and cold water-logged fields. It has been a major factor in the steady increases in this region's agricultural production.

Around the lake and where the five rivers empty into the lake, preliminary changes have been made in the scattered, disjointed and small-scale dikes. Today the region has more than 500 dikes totaling nearly 4,000 km in length for the protection of 6 million mu of cultivated land. This includes the expansion of the cultivated land area by 2.1 million mu through gradual reclamation and joining together of dikes. Today, more than 70 of the dikes are capable of protecting more than 10,000 mu, and flood protection standards have been greatly upgraded through dredging and through strengthening of dikes for the protection of more than 3 million mu of cultivated land. Today 54 dikes are capable of withstanding flood waters on the 1954 scale. They are about 465 km long and protect about 1.57 million mu of land. They account for 16 percent of the total length of all dikes and protect 38 percent of the land area. In places where hills and downlands are found widely, there has been much building of reservoirs and mountain pools for development of irrigation, and a great deal has been achieved. All jurisdictions summarized and promoted their experiences with specific local conditions in "a combination of building dikes along rivers, providing irrigation to high fields, and lifting water" for rather good results.

B. Farm mechanization has developed. Though this region depends rather heavily on human and animal power (in 1979, each member of the work force was responsible for 3.92 mu of cultivated land, and each draft oxen served 25.5 mu of cultivated land, both of which were higher than the provincial average), nevertheless the mechanization of agriculture has proceeded fairly swiftly and conditions are relatively good. In 1979, the whole region had more than 2.17 million horsepower of machines, which was more than half the total machine horsepower for the province as a whole. The actual machine-cultivated area was 5.08 million mu, which was 34.1 percent of the total cultivated land area, giving the region first place among all the province's agricultural regions. In the areas of plant protection, threshing and processing of agricultural and sideline products, the level of mechanization increased. A look at development of the farm-machinery industry shows a fairly good foundation, with most of the province's large industrial plants producing tractors, drainage and irrigation machines, and machines to process agricultural and sideline products being located in this region. This also provides relatively favorable conditions for this region's mechanization of agriculture.

C. Increase in fertilization. Green manure is the principal source of fertilizer for this region's fields, particularly for its early-rice crop production. Since liberation, the green manure area has gradually

increased as the farming system has steadily improved. In 1979, the regio had a green manure area of more than 8 million mu, which was 23 percent of the total area sown to farm crops. Yields of fresh grass were between 2,000 and 4,000 jin per mu, which was higher than the average for the province as a whole. In 1979, the region raised 3.91 million hogs (the number in inventory at yearend), an average of 0.26 head per mu, which was the average number for the province. Expansion of the growing area for green manure and development of hog raising have provided large quantities of superior organic fertilizer for the region's agricultural production, and have given powerful impetus to a steady rise in the level of agricultural production. In 1979, the region applied an average of 87 jin per mu of nitrogenous fertilizer. This was still not enough to meet needs for the development of agriculture, and a further increase is awaited.

D. Readily available communications and transportation. This region is centrally located geographically; its topography is flat; and it is served by many rivers and lakes, which make for relatively convenient land and water transportation. It is the region in the province with the best developed communications and transportation. Specifically, the Zhejiang-Jiangxi, the Nanchang-Jiujiang, and the Nanchang-Jiangbiancun railroads cross the region. The Gan river flows north and south, and in the north is the Yangtze River connecting with all the provinces of the Yangtze River basin. The readily available transportation inside and outside the province, plus the vast hinterland are doubtlessly beneficial factors in development of the region's agricultural production, particularly in its building of agricultural commodity bases.

E. Relatively good foundation in agricultural science and technology. This agricultural region is located in the province's economic and cultural heartland where agricultural S&T research institutions are numerous. The province's largest multidiscipline agricultural organization, the Jiangxi Provincial Academy of Agricultural Sciences, is located in suburban Nanchang, and the nationally famous Red Earth Research Institute is located in Jinxian County in this region. Additionally, there are other important research institutes and experimental farms (or stations), and the four-level agricultural science network has also developed very greatly. The Jiangxi Provincial Agriculture University, specializing in the training of skilled agricultural S&T personnel, is also located in Nanchang's northern suburbs. For many years a large number of S&T personnel have made new progress in improving the red earth, in selective breeding of new varieties, in sensible fertilization, in plant protection, in farm machinery, in livestock and aquatic products, and in fruit trees and vegetables. A multitude of research organizations, relatively strong S&T ranks, and a relatively good foundation in scientific research all augur extremely well for development of agricultural production in this region.

Second Section. Current Status and Characteristics of Agriculture, and Variations Within the Region

1. Current Status

A. Agricultural Production Is Multifaceted and Complex

This is an agricultural region of the province with complex agricultural sectors and diverse kinds of crops in which farming is the most important production sector. Forestry aside, animal husbandry, the fishing industry, and commune and brigade industrial sideline occupations all have a definite place. The region grows varied kinds of farm crops, a fairly substantial part of the whole province's growing area being taken up by paddy rice, cotton, wheat, sweet potatoes, soybeans, rape, sesame, jute, flue-cured tobacco and sugarcane, fully demonstrating the multifaceted and complete characteristics of the region's agricultural production. Paddy production is the major sector of this region's farming industry accounting for 54 percent of the total area sown to crops in 1979. The wheat-growing area is also very considerable. Next come soybeans and sweet potatoes. Cash crops are grown on 4.21 million mu, or 11.7 percent of the area sown to farm crops (the cotton area being the largest at 31 percent; rape 39 percent [sic]; sesame, 20 percent; peanuts, 6 percent; and the rest sown to jut, ramie, sugarcane, tobacco).

B. Fairly High Commodity Rate for Major Farm Products, and a Substantial Contribution

The grain, cotton, fats and oils, and aquatic products sectors provide the greatest contribution in commodity production to the country from this region. In 1979, the whole region provided a total of 2.41 billion jin of unprocessed commodity grain, or 43 percent of the total for the whole province. If purchases at negotiated prices are figured in, it provided 2,826,000,000 jin of unprocessed grain for a 27.8 percent commodity rate. The commodity grain (including grain purchased at negotiated prices that was provided) by the 10 counties of Nanchang, Ago'an, Fengcheng, Boyang, Yugan, Xinjian, Linchuan, Jinxian, Leping and Qingjiang totaled more than 100 million jin. Nanchang County alone provided nearly 460 million jin of grain. Cotton production held an even more prominent place within the province. In 1979, this region had more than 90 percent of the area sown, the output, and the amount of gin cotton provided in the province. Pengze County provided one-fifth of the total amount of marketable ginned cotton purchased in the province or more than 168,000 dan. Second was Jiujiang, Xinyu, Ruichang and Duchang with more than 50,000 dan. Hukou, Gao'an, Boyang, Leping and Jinxian counties has more than 30,000 dan. Output of fats and oils, live hogs and aquatic products also held an important position in the whole province. In 1979, the whole region provided more than 39.8 million jin of marketable fats and oils, which was more than 52 percent of the total for the whole province. It provided more than 1.45 million head of marketable hogs, or 40 percent of the total for the whole province; and it provided more than 130,000 dan of aquatic products, or more than 84 percent of the total for the whole province.

Clearly, this region's agricultural production holds a pivotal position in the province in agricultural production. The speed of its development, and particularly the speed of growth of commodity production, have either directly or indirectly had a tremendous and deep affect on development of the national economy throughout the province and on the national economy and the people's standard of living.

C. Unbalanced Development of Major Agricultural Production Sectors

1. Grain Production Has Developed Relatively Rapidly, But Cash-Crop Production Has Been Inconsistent

Grain production centering around paddy rice has been the agricultural production sector that has developed more rapidly than others in this region. In 1979, the region's grain area covered more than 23.05 million mu, and gross output of grain approached 10.17 billion jin for grain yields of 876 jin per mu of cultivated land. The trend has been toward fundamental increase during the past 30 years. On the other hand, the output of cash crops has been inconsistent. In general, steady growth occurred in both gross output and yields per unit of area between the period immediately following liberation and 1965, but between 1966 and 1976 both the growing area and output declined. Despite substantial revival during the past 3 years, neither area nor output have reached their all-time high levels. In some of the areas that once had a rather good foundation and were significantly specialized in the growing of cash crops, such as ramie, flue-cured toabcco, sugarcane and silkworm mulberry, the extent of decline has been considerable, and they have become one of the weak links in the region's agricultural production.

2. Development of Animal Husbandry, But Rather Great Decline in Aquatic Products

Since liberation, a certain amount of development has occurred in this region's animal husbandry production, particularly in the raising of live hogs. In 1979, the region had 3.91 million hogs in inventory versus 722,000 in 1949, a more than fourfold increase. Both per mu yields and per capita yields increased, with the whole region averaging 0.39 head per capita of agricultural population, which was higher than the average 0.36 head for the province as a whole.

The region's cattle industry also developed, the raising of draft oxen accounting for more than 90 percent of the total. Water buffaloes have been the principal plow animals, and most of these have been the superior lakeshore water buffalo with a long body, that develops well, and that has a particularly well-developed chest. Since they have been raised on lakeshore flatlands for a long time, they are fairly tolerant of cold and heat, and are fairly strongly adapted to schistosomiasis. Lakeshore oxen are the most common kind of oxen. They make rather strong draft animals, however, because of the threat that leeches, pulmonary filariasis and live flukes pose, growth, development and increase in output are impaired, and more preventive work must be done against parasitic diseases.

The raising of goats and rabbits, beekeeping and the growing of domestic fowl also hold important positions throughout the province in addition to the raising of hogs and cattle. The sheldrakes of all lakeshore counties, and the fine-haired goats from Lu Shan are famous within the province, and in recent years apiculture has seen substantial revival and development.

This region's farming industry is well developed; it is fairly rich in grain; and it has widespread sources of fodder, making for extremely outstanding conditions for development of animal husbandry production. The lakeshore grassy flatlands are particularly large in area, and each year large quantities of organic matter are brought in during flood season, so the flatlands are fertile and pasture grass thrives. The principal grass cover on these lake flats--colonies of Jiantai [1423 5377]--make fine pasture grass colonies and include jiantai, zhongchui suitai [6850 0987 4482 5377], barnyard grasses, and wangcao [5413 5430], which grow in verdant profusion during autumn and winter. Except during the flood period when they are covered with water, they grow all year round and domestic livestock love to eat them. Hill regions, too, have a very large amount of grass cover. Except for the dead of winter when feeding is done in sheds, animals may be pastured most of the year. A very great potential exists for development of cattle and hog production. Full use should be made of these favorable conditions in the future, and counties, farms (or communes) and suburban areas that make rather good bases should be selected for the building of animal husbandry production bases in order to hasten development of the livestock industry and to gradually raise the position of the animal husbandry industry within agriculture.

The region's fishing industry has developed in a wavelike motion. In 1979, the region's gross output of aquatic products stood at 778,000 dan and had not yet revived to the all-time high. Breeding had developed fairly greatly, but substantial decline had occurred in natural catches (Please see the fourth part of the third section of this chapter for details).

3. Substantial Expansion of Tea and Fruit, But Relatively Weak Forestry

Since liberation, concomittant with improvement of the region's red earth downlands and hills has been extremely great development of tea, tea oil and fruit production, which has been very successful. Today the region has 1.34 million mu of tea groves, most of them in the hill and downlands regions, particularly in the southern part of the region. Great efforts have been made to develop tea production in the vast red earth low hill regions. As of 1979, the region had 170,000 mu of tea plantation area. Fengcheng and Pengze counties were newly developed tea-growing counties. The tea plantation area for the growing of Yunwu tea from Lu Shan, which is renowned in China and the world, had increased to more than 6,000 mu by 1979, and produced more than 2,000 dan of tea. The region's orange and tangerine production has also developed fairly rapidly, and as of 1979, the region had one-third of all the province's

area growing oranges and tangerines and produced one-fifth of its tangerines. Qingjiang County in the southern part of the region has the largest growing area and the largest output, more than 40 percent of the total for the region. This region is located a little northward where the terrain is broad and low temperatures arrive early, the temperatures dropping very suddenly, with the result that the tangerines and oranges frequently sustain freeze damage.[2] Development of orange and tangerine production requires selection of cold-tolerant varieties and every effort made to select those that may be grown in some mountain basins. Caution should be exercised in large-scale growing of oranges and tangerines in plains and hill regions. In addition, all the northern counties in this region have developed the growing of peaches and pears.

This is the region of the province with the smallest forest area, and the one with the lowest forest cover rate. It is the region with the weakest forestry production and the most serious shortage of timber, the forested area amounting to approximately 17.5 percent of the land area, which is very greatly lower than the average for the province as a whole. In recent years, quite a few counties and cities have been extremely attentive to the building of forestry, and Gao'an, Dongxiang, and Jinxian counties have emerged as advanced models. Formerly erosion was serious in Dongxiang County, but during the past more than 10 years, previous methods have been adapted to the local situation, all-round planning has been done, and major efforts have been made to afforest mountains, with the result that 10 China fir forest tracts have been built on more than 10,000 mu; there are 5 tracts of tea oil forests totaling more than 10,000 mu; 430,000 mu have been closed off for the propagation of forests, and more than 7 million individual trees have been planted in the "four besides" in the development of farming, forestry and animal husbandry. Effective action will have to be taken in the future for further conscientious attention to building of this region's forestry. Major efforts will have to be made to develop pine, China fir, and bamboo timber forests in low mountain and hill regions. Bases for the production of tea and tea oil will have to be built in the red earth low hills and downlands area. In addition, widespread efforts will have to be made to stir the masses to undertake large-scale planting of trees in the "four besides" for a gradual increase in the region's forest recover rate, improvement in the natural landscape, and an expansion of forestry production.

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2 In 1977, for example, this region experienced rarely encountered low temperatures. In Qingjiang County, the minimum temperature was -11.6°C (on 5 January), and the oranges and tangerines were freeze damaged, output declining by about 70 percent (quoted from the 1978 premier edition of "Jiangxi Orange and Tangerine Science and Technology Bulletin," and from "Survey of 1977 Orange and Tangerine Freeze Damage in central and northern Jiangxi.")

D. Circular Pattern Land Utilization

This region's plentiful agricultural resources, its diverse soil types, and the complexity of its agricultural structure are reflected in definite regional patterns. The terrain is basic in this pattern, which has been formed under the combined influence of natural and socioeconomic conditions. The overall natural landscape spreads out from Boyang Lake at its center in a succession that goes from the lake beach area made up of lacustrine alluvium, sandy flats and sandy deltas to alluvial plains along the lake, to mostly alluvial plains interspersed with low hills and downlands, to red earth ot red-soil-covered low hills and downlands and rolling plains, to a red basin area of low mountains and low hills, to surrounding low hills and mountains. In the course of the production struggle over a long period of time, the people of this region have gained a full understanding of the nature of the foregoing natural environment and have suited general methods to local situations for the development of agricultural production possessing various features. This has been reflected in a land utilization and a crop makeup characterized by a circular pattern. In the inside of the circle, the lakeshore plains area is broad and is interspersed with a dike region and low hills. The reclamation and cultivation index is fairly high, and agricultural production is characterized by a combination of paddy rice, cotton and aquatic products. Newly reclaimed areas are grain and cotton bases whose production is fairly strongly specialized. At the outer edges of the circle, the proportion of downlands and hills is fairly large, and the reclamation and cultivation index is relatively low. Paddy rice is the dominant crop, with the growing of other grains, cotton, tea, fruit and forests. At the center of the circle, the cultivated land is low, flat, and in continuous tracts. As a result, waterlogging and stagnant-water calamities are fairly common. Agricultural production is frequently high but inconsistent. Around the outer edges of the circle, fields are numerous relative to available labor, and both drought and waterlogging disasters occur. Grain output is usually consistently but not high, and conditions for forestry production are relatively good.

2. Variations Within the Region

As a result of the impact of natural and socioeconomic conditions, fairly marked variations exist between south and north in the natural environment, in the makeup of agricultural production, and in the farming system, giving rise to a division into two subregions as follows:

A. Northern Cotton, Oil, Grain and Aquatic Products Subregion

This subregion is located north of Boyang Lake and includes Jiujiang city, Jiujiang, Hukou, Pengze, Duchang, Xingzi, Ruichang, De'an, and Yongxiu counties, plus Lu Shan, a land area of approximately 18,800 sq km (i.e., 16.2 million mu). This subregion's topography is fairly complex, and the topography is slightly higher overall than south of Boyang Lake. Hills account for 34 percent of this subregion's land area, and most of the plain is at an elevation of less than 50 m above

sea level. It is an undulating plain with a relative elevation of 5 to 7 m. Climatic conditions favor growing of paddy rice, cotton and such warmth-loving crops. However, this subregion is located a little northward, so it is first to be hit with cold weather. This is bad for panicle formation and flowering of the second rice crop. Spring cold also leads to the rotting of seeds and seedlings, so the growing of two crops of rice requires selection of cold-tolerant early- and medium-ripening varieties.

The Lu Shan mountainlands that tower over the central part of the subregion have a main peak, Hanyang Peak, that is 1,474 m above sea level. Not only are there marked vertical variations in the natural environment and agricultural production patterns in the mountains themselves, but because of the northeast by southwest orientation of the mountain mass, the mountain acts like a screen that gives rise to regional variations in agriculture south and north of the mountain.

This subregion has more than 3 million mu of water surfaces that provide relatively good conditions for development of inland lake breeding and natural catches. This is an important integral part of the Boyang Lake aquatic products base.

This subregion's agricultural land utilization, crop structure, and farming system may be largely characterized in the following several ways:

1. A large population relative to available fields, with a large proportion of drylands. Population density for the region is 235 per sq km. Cultivated land averages 1.25 mu per capita of agricultural population, making this one of the region's in the province in which the average burden per capita of agricultural population is relatively light. Though wetlands account for the greater percentage of cultivated land, the percentage of drylands is larger than in any other agricultural region in the province. In 1979, drylands accounted for more than 40 percent of the cultivated land area. A relatively abundant labor force and a relatively large amount of drylands provide extremely favorable conditions for expansion of production of cash crops, notably of cotton.

2. The proportion of cash crops is large, and it is the most concentrated cotton-growing base in the whole province. In 1979, the whole subregion had a 1.17 million mu area sown to cash crops. This was 19.4 percent of the total area sown to crops, and 42 percent of the cultivated land area. Cotton accounted for 43 percent of cash crops and was sown on a 510,000 mu area, or 34 percent of the province. Ginned cotton yields averaged 87 jin per mu, much higher than the 57 jin per mu average for the province as a whole. Second was oil-bearing crops, which accounted for two-fifths of the area in cash crops. Rape held the leading position, making this subregion the main rape-growing area of the province. The area sown to it was large, yields per mu were high, and the amount of marketable grain provided was great. Ramie is also one of the major products of the northern part of this region, though the area has declined

in recent years. Today fewer than 10,000 mu are sown to ramie, and this area is concentrated in Ruichang, Duchang and Jiujiang counties. Tea is a cash-crop shrub that has developed fairly rapidly in this subregion. Not only have the famed Yunwu tea production bases in Lu Shan been consolidated and developed, but as much as 10,000 mu of new tea plantation bases have been opened up in the hill and downlands region of Pengze and other counties. Prospects for their development are good.

3. The multiple-cropping index is relatively high, mostly to the growing of cotton and wheat in two crops. Since the proportion of hills and downlands in this subregion is large, despite the fairly dense population, the reclamation and cultivation index is relatively low at approximately 16 percent. The multiple-cropping index (including green manure) is relatively high, reaching 230 percent. The main farming systems used in this subregion are cotton and wheat in two crops, green manure-paddy-paddy, or oil-bearing crop-paddy-paddy in a three-crop system. In communes and brigades having a large population relative to fields, a three-crop farming system has also been developed of wheat-rice-rice, or wheat-soybeans-autumn sweet potatoes.

4. Grain production consists principally of the growing of paddy rice, plus a large percentage of wheat. Paddy rice accounts for approximately 72 percent of the area sown to grain crops in this subregion, the lowest for all agricultural regions in the province. By contrast, the percentage of wheat grown is higher than for other regions of the province. In 1979, wheat was sown on an area of 500,000 mu, which was 13 percent of the area sown to grain crops, and more than one-fourth the total area sown to wheat in the whole province. Since the percentage of cash crops, mostly cotton, grown in this subregion is large, the subregion is not self-sufficient in grain and must annually import between 100 and 200 million jin of grain from other regions.

If one is to proceed from the realities of this subregion, the main production tasks to be tackled included equitable planning of the proportions of cotton and grain, active promotion of wetland and dryland crop rotation, large-scale farmland capital construction centering around the improvement of soil and harnessing of waters, transformation of agricultural production conditions, consolidation and development of marketable cotton production, vigorous increase in grain crop yields per unit of area, a rise in the level of self-sufficiency in grain, and efforts to build this subregion into one of the province's major cotton bases.

B. Southern Paddy, Cotton, Oil and Aquatic Products Subregion

This subregion includes Boyang, Leping, Wannian, Yujiang, Yugan, Linchuan, Jinxian and Dongxiang counties, plus Fuzhou City, Fengcheng, Qingjiang, Xinyu, Gao'an, Anyi, Nanchang and Xinjian counties, and the suburbs of Nanchang, with a land area of almost 30,000 sq km and accounting for 74 percent of the agricultural land area of the Boyand Lake Plain in northern Jiangxi. In 1979, the population of this area was approximately

9.6 million, or 78.8 percent of the total for the region. This subregion has a wide area; the terrain is flat; it is the heartland of the Boyand Lake Plain, and elevation above sea level is less than 100 m. Except for the Xiu River, all the other rivers of the five-rivers system, namely, the Gan, Fu, Xin, and Rao enter Boyang Lake in this subregion. In their lower reaches where they enter the lake, the foregoing rivers form a low, flat plain and alluvial deposits in the lakeshore area. This alluvial plain is lower than 30 m above sea level. The largest such plain is the Ganfu Plain, which has the lowest and flattest terrain and an area totaling approximately 2,000 sq km (i.e., 3 million mu) and takes up 7 percent of the subzone area. The hill area is smaller than the northern subzone, accounting for 26 percent of the total area. The low hills and downlands, and the flat marshy plain provides extremely favorable conditions for large-scale development of this subregion's farming and acceleration of agricultural modernization. The extensive lake and river water surfaces provide a rich natural endowment for this subregion's development of freshwater aquatic products enterprises. Today there is a more than 3.4 million mu area of river and lake water surfaces, or about 7.5 percent of the region's total land area, that is concentrated around the lake in Boyang, Yugan, Jinxian, Nanchang and Xinjian counties. This subregion has been a famed land of fish and rice since ancient times.

This subregion lies slightly to the south in latitude, so average annual temperatures are a little high. Annual precipitation is markedly greater than in the northern subregion and gradually diminishes from east to west. Midautumn drought occurs with noticeably less frequency than in the north. Water, heat and light conditions are abundant and are extremely favorable for agricultural production. However, because of the great variation in rainfall, flooding and waterlogging frequently threaten the lower reaches of all major rivers where they empty into the lake, while drought disasters occur in hill and downland areas. Low temperatures during winter and spring cause serious freeze damage.

As compared with the northern subregion, agricultural production in this region has the following characteristics:

1. High Rate of Land Utilization, With a Large Percentage of Wetlands

The flat terrain of this subregion, the long history of its development and its relatively superior water conservancy, farm machinery and chemical fertilizer conditions have resulted in a relatively high rate of land utilization. In 1979, the reclamation and cultivation index for the whole subregion was 27 percent, and the multiple-cropping index was 247 percent (or 188 percent if green manure is not included), both of which are higher than for the northern subregion. This is also one of the regions of the province with the highest land-utilization rate. One important feature of land utilization in this subregion is the high percentage of wetlands. In 1979, there were more than 9.4 million mu of wetlands, or 77 percent of the total cultivated land area.

2. Numerous Kinds of Crops, With Paddy Rice Holding Absolute Dominance

This subregion runs the gamut of agricultural production sectors, and it has diverse crops with paddy rice holding absolute dominance. In 1979, the area sown to paddy rice accounted for more than 56 percent of the total area sown to farm crops, a much higher percentage than in the northern subregion. Gross output of grain for the whole subregion was 8.6 billion jin of which 2.5 billion jin was provided as marketable grain (including purchases at negotiated prices). This was 33 percent and 39 percent, respectively, of the total for the whole province. Within the subregion, 10 counties provided more than 100 million jin of marketable grain, making this an important commodity grain base for the province and the country alike. This subregion also grows a fairly large range of cash crops, notably cotton and oil-bearing crops. In 1979, the area sown to cotton accounted for 2.7 percent of the total area sown to farm crops, and the area sown to oil-bearing crops amounted to 4 percent of the area sown to farm crops, with sesame production holding the most important position in the whole province, gross output in 1979 amounting to more than 64 percent of the total for the whole province.

3. The Growing of Green Manure-Paddy-Paddy or Oil-Bearing Crop-Paddy-Paddy Is the Principal Farming System Used in This Subregion

In this subregion, more than one-half of the total area sown to farm crops is sown to paddy rice. Because of the large wetland area and traditional farming habits, 82 percent of the wetland area is sown to Chinese milk vetch, vastly more than in the north. The growing of green manure-paddy-paddy is the most important farming system of this subregion. In addition, the area intercropped with cotton and wheat is also considerable, and a two-crop system is used to grow sweet potatoes and wheat, cotton and rape, cotton and Chinese milk vetch grown for seed stock, and jute and rape. In the suburbs of cities and towns where population is large relative to farmland, experimental promotion by agricultural research units in recent years of oil-bearing crops-paddy-paddy, and wheat-paddy-paddy has also been successful.

4. Orange and Tangerine Production Is of Marketable Significance Within the Province

This subregion's orange and tangerine production has developed fairly rapidly. In 1978, the orange grove area and output accounted for 75 percent and 99 percent, respectively, of totals for the whole agricultural region, and was concentrated mostly in Qingjiang and Xinyu counties in the southern part of the subregion. An overwhelming majority of output was sold inside and outside the province.

In summary, this subregion is a completely developed all-round agricultural region that grows paddy rice, cotton, oil-bearing crops, aquatic products, oranges and tangerines and tea, with grain production dominating. In view of the region's characteristics, energetic efforts will have to be made to build water conservancy in order to solve problems with flooding,

waterlogging, and midautumn drought, and to accelerate agricultural mechanization. Efforts will have to be made to effect a garden-style farming and to implement the "eight-character charter" in a comprehensive way, to farm scientifically, to build a group of consistently high-yielding fields, to hasten the building of commodity grain bases, and to advance all-round development of agricultural production.

At the same time, it will be necessary to handle properly the relationship among farming, forestry, animal husbandry, sideline occupations and the fishing industry, to make full use of the subregion's favorable conditions, and to suit general methods to specific circumstances for vigorous development of the raising of hogs, cattle, goats, rabbits and bees, for revival and development of fishing industry production, and to hasten the building of forestry. Attention should be given development of production sectors that have a fairly good historical foundation and a traditional flavor, such as the growing of cash crops like oranges and tangerines in Qingjiang County, of flue-cured tobacco and silkworm mulberry in Gao'an county, of sugarcane in Dongxiang County, of jute in Boyang and Yugan counties, and of pepper in Leping County. Water fowl production should also be developed in lakeshore regions to satisfy people's needs in cities and the countryside, the needs of local industries, and export needs.

This subregion has a fairly large number of industrial and mining cities and towns, and both industry and transportation are well developed. Not only the provincial capital of Nanchang, but all prefectures, counties and towns have a substantial local industrial foundation. This is a favorable condition for development of this region's agricultural production. It must be realized at the same time, however, that the "three wastes," [waste water, waste gas and industrial residues] from industry, pose substantial dangers for agricultural production. This should arouse the serious attention of authorities concerned, and protection of the environment should be watched so it does not become polluted. Additionally, efforts to develop suburban agriculture and to guarantee supplies to cities is also of major importance in this region.

Third Section. Several Problems in Further Development of Agricultural Production

1. Problems in the Building of Marketable Grain Bases

A. Necessity for Building of Bases and Analysis of Conditions

In order to satisfy fully the need for high-speed development of the national economy and steady growth in grain production for the people's standard of living, it is imperative that the state concentrate required manpower, material and financial resources to make full use of each region's natural resources and labor forces, carry out the planned building of marketable grain bases, and accelerate development of agriculture in order to provide the country with more marketable grain.

Generally speaking, the following conditions are essential to the designation of a marketable grain base: (1) fairly good agricultural production conditions and a definite foundation so that the country can gain substantial economic results from use of a relatively small amount of manpower, material and financial resources; (2) a fairly high marketable grain rate[3] and an interregional marketable grain rate[4] are main criteria in designating marketable grain bases. Only when the commodity rate is fairly high is it possible to show that a region can ship out large quantities of grain to help outside areas and to make a substantial contribution to the country; (3) fairly large production potential. In long-range terms, the emphasis in designating such a region for the building of a commodity grain bases holds strategic significance; (4) concentration in continuous tracts, with fairly good transportation and communications facilities.

The Boyang Lake Plain has numerous favorable conditions for the building of commodity grain bases. First of all, natural conditions are superior. The region's topography is flat; it has countless lakes and rivers; the climate is warm and moist; light, heat, water and soil resources are abundant, and conditions for development of agricultural production are extremely superior. Second, the Boyang Lake Plain has historically been a major commodity grain base for both the province and the country as a whole. It has a long history in the development of agricultural production, a relatively good foundation, and thanks to the arduous efforts at development of the working people, it has become a major granary for the province whose grain output shows a relatively high marketable rate. In 1979, for example, state purchases of unprocessed grain (including purchases at negotiated prices) totaled more than 6.41 billion jin for the province as a whole, with more than 44 percent of this total being provided by the counties on the Boyang Lake Plain. Third, this region holds tremendous potential for grain production over the long term. This is manifested in the following ways: (1) the average amount of cultivated land per capita of agricultural population is higher than for any of the commodity grain bases in the south (See Table 3-4); (2) though current grain yields per mu are higher than the average for the province as a whole, they are lower than for commodity grain bases in other provinces. Comparison with the Hangzhou-Jiaxing-Huzhou area shows a difference of 500 jin per mu in yields. There are also large areas of low yield fields in the region, which once improved, will result in great increases in grain output; (3) the grainfield multiple-cropping index is also lower than for other marketable grain bases. In 1979, the grainfield multiple-cropping index (including green manure) was 199 percent. Were the area planted to green manure in winter to be suitably reduced and the growing of spring grain increased, the marketable grain rate could be raised. Additionally, with steady improvement in agricultural production conditions, a certain amount of wastelands in the region become available

3 The percentage of the total amount of grain produced that is purchased by the state is the marketable grain rate.

4 The percentage of total grain output that is shipped out is the interregional marketable grain rate.

for reclamation. Furthermore, the convenient water and land transportation in this region helps solve problems in the processing and hauling of the means of production and of agricultural and sideline products.

Table 3-4. Comparison of Old Marketable Grain Bases on the Boyang Lake Plain in the Middle and Lower Reaches of the Yangtze River

表3—4　鄱阳湖平原与长江中下游老商品粮基地比较

	地 a) 区 ／ 项 b) 目	每农业人口拥有耕地 c)（亩）	粮食耕地亩产 d)（斤）	每农业人口占有粮食 e)（斤）	粮食商品率 f)（%）	附注 g)
h)	鄱阳湖平原	1.8	678	1044	21.3	1972年
i)	两湖平原	1.6	718	911	21.5	1971年
j)	杭嘉湖平原	1.3	1190	1215	28.1	1972年
k)	苏南地区	1.4	903	1161	26.4	1971年

1）资料来源：中国科学院地理研究所主编：《中国农业地理总论》第四章（油印）

Key:
a) Locale
b) Particulars
c) Amount of cultivated land per capita of agricultural population (mu)
d) Grain yields per mu of cultivated land (jin)
e) Grain output per capita of agricultural population (jin)
f) Marketable grain rate (%)
g) Remarks
h) Boyang Lake Plain
i) Two lakes plain
j) Hangzhou-Jiaxing-Huzhou Plain
k) South Jiangsu region
1) Source of data: "China Agricultural Geography," Chapter 4, Geography Institute, Chinese Academy of Sciences, (mimeographed).

B. Kinds of Grain Production and Size of Bases

In order to determine scientifically the size of grain bases and the scale of their development, the present status and kinds of grain production must be analyzed. The 26 counties and cities in this agricultural region may be divided into four categories on the basis of their 1978 grain output, purchases and sales as follows:

1. Those devoted mostly to grain production in which grain production was on a fairly large scale, at a high level, with substantial gross output and a commodity rate of better than or approaching 30 percent, and that

had net shipments of more than 100 million jin of unprocessed grain were Nanchang, Fengcheng and Yugan counties. Of these, Nanchang County's net shipments of unprocessed grain reached 332 million jin.

2. Those devoted mostly to grain production in which the scale of development, though relatively small, amounted to a gross output of more than 200 million jin and the marketable rate was also around 25 percent, with net shipments of more than 40 million jin of unprocessed grain were Qingjiang, Yujiang, Xinjian, Anyi, Linchuan and Dongxiang counties.

3. Those devoted mostly to grain production, but in which the growing of cash crops amounted to a certain percentage generally more than 10 percent of the total area sown to farm crops, with a marketable grain rate of more than 20 percent as well, and net shipments of more than 30 million jin of unprocessed grain were Boyang, Gao'an, Jinxian, Leping and Wannian counties.

4. Counties with fairly small-scale grain output providing relatively small amounts of marketable grain were De'an and Xingzi. In addition Jiujiang, Hukou, Yongxiu, Duchang, Xinyu, Ruichang and Pengze counties, plus Fuzhou City and suburban Nanchang were deficit grain counties and cities mostly either because of the growing of substantial amounts of cash crops or because the nonagricultural population was fairly large.

Obviously, designation of the 14 counties in foregoing categories 1, 2, and 3 as key commodity grain counties in the Boyang Lake Region commodity grain base makes sense, and conditions exist for this. Some of the counties in category 4 are trying to proceed from self-sufficiency in grain to greater development of cash crop production. Others are developing mostly cash crops and have to bring in grain from elsewhere, and this also accords with realities. Of these, suburban Nanchang, Jiujiang and Fuzhou cities should emphasize development of suburban agriculture to serve cities and the tourist trade.

It should be noted that even in the case of counties designated grain bases, the direction of development of agricultural production within any given county will vary as a result of different natural conditions between one commune or brigade or another, their historical background, the burdens placed on human and animal labor, and differences in the crop structure. It will be necessary to suit general methods to specific circumstances and to proceed from realities in designating key grain-producing communes and brigades. Within key grain-producing counties, there may be non-key grain-producing commune and brigades. Standards for key grain-producing communes may be generally stated to be as follows: a marketable grain rate of more than 30 percent; approximately 1.8 mu per capita of agricultural population of grain-growing land; and each member of the agricultural population providing more than 400 jin of marketable grain.

C. Measures for Setting the Course in Accelerated Building of Bases

1. A Firm Grip on Farmland Capital Construction Centering Around Soil Improvement and Water Control for Fundamental Change in Agricultural Production Conditions

Farmland water conservancy endeavors in the Boyang Lake region have seen great development since liberation, however, in an overall sense, this development has been neither speedy nor of high quality. Agricultural production is still basically in a state of "increased yields when the weather is fine, and reduced yields when calamities strike." Flood and drought disasters occasion very great inconsistencies for this region's agricultural production.[5] A firm grip on farmland capital construction centering around soil improvement and water control, expansion of the farmland area that produces consistently high yields, and fundamental transformation of production conditions is a basic measure for accelerating the building of marketable grain bases in this region.

Large-scale construction of farmland water conservancy requires, first of all, a complete end to flood and waterlogging disasters as its focal point and the building of farmlands capable of delivering consistently high yields despite drought or waterlogging. Statistics show 14 counties in all bases as having a 3.5 million my consistently high-yielding farmland area in 1979. This averages out to 0.49 mu per capita of agricultural population, which though higher than the 0.40 mu average for the province as a whole, is a long way from meeting the need for 1 mu per capita of farmlands able to deliver consistently high yields despite drought or waterlogging, and it is one of the lowest regions among all the marketable grain bases south of the Yangtze River. Furthermore, standards are comparatively low. Because of differences in natural conditions, historical background and farming systems, regional distribution of farmlands that produce consistently high yields is also uneven. The overall pattern is that places having a large percentage of wetlands also have a large percentage of consistently high-yielding fields; places having a lot of dryland fields have a small percentage. For plains areas, the percentage is higher than for hill regions. Currently all bases have more than 2 million mu of farmland that is prone to flooding, and more than 1.2 million mu of farmland that is prone to drought. Most such places are located either in hills and downlands or along rivers and around the lake. Complete eradication of the threat of drought and waterlogging so that all fields deliver consistently high yields despite drought or waterlogging will be an extremely arduous task.

5 Take, for example, the 12 lakeshore counties (including Nanchang, Xinjian, Jinxian, Yugan, Wannian, Leping, Boyang, Hukou, Xingzi, Duchang, Yongxiu and De'an), which sustained flood disasters in 1954 as a result of which total grain output was 18 percent less than in 1953. As a result of flood disasters in 1962, their total grain output was 5 percent less than in 1961, and as a result of flood disasters in 1973, 41 percent of all cultivated land was inundated, with 52 percent of the area of the whole province being innundated that year, output from the early paddy crop declining by 1.1 billion jin as a result.

This base is located at Boyang Lake in the lower reaches of each of the main rivers where the plains area is vast. In addition to receiving runoff from this region itself, water from the middle and upper reaches of all rivers in the province pass through this region to enter Boyang Lake. In addition, seasonal precipitation is distributed unevenly, between 44 and 52 percent of the average amount of precipitation for the entire year falling between April and June. Consequently the water level changes greatly, usually 9 m but a maximum of 15.78 m (See Table 3-5). Damage from flooding and waterlogging is considerable, and is one of the crucial reasons for further development of this base's agricultural production. Consequently, farmland water conservancy construction at this base requires all-round planning, tackling the job in a comprehensive way, coming to grips with this main flooding and waterlogging contradiction and achieving a proper emphasis.

Large-scale farmland water conservancy construction also requires the suiting of general methods to specific circumstances. This base has a vast land area, and its agricultural microlandforms are varied. Water conservancy conditions vary very greatly from the diked area around the lake to the plains terraces, to the low hills and downlands requiring the suiting of general methods to local situations to take different actions.

Though the percentage of consistently high-yielding farmlands in the diked area around the lake is currently relatively large, overall standards are not high. Neither dike elevation nor engineering quality meets requirements for a considerable portion of the farmland. The terrain is low and flat here, with a general elevation above sea level of between approximately 15 and 18 m, and a relative height of about 5 m. The surface slope is extremely gentle at about 0.4 parts per 10,000. Where the lower reaches of the Gan and Fu rivers enter the lake, bird-foot-like deltas have formed through which river channels branch and lakes are dotted here and there. The water system is jumbled, and the threat of flooding and waterlogging disasters is considerable. Therefore, projects to increase the height and strengthen the dikes, large-scale networking of rivers, and building of garden-style fields to solve problems in flood prevention and draining away of stagnant water, and to guard against marshiness are major tasks in farmland capital construction in the diked area around the lake. Nanxin Commune in Nanchang County on the banks of Boyang Lake in the lower reaches of the Gan River is a typical lakeshore lowlying area. In 1975, large-scale river networking was begun with the digging of 233 new irrigation and drainage ditches 600 li long. Altogether 30 intersecting ditch projects were built for drainage and irrigation, drainage and irrigation being kept separate from each other so that water would be available during drought, and so that water could be drained away during waterlogging. Grain output rose greatly. Between 1975 and 1977, output rose an average of 15 million jin annually. In 1977, when there was a large flood the likes of which has rarely been seen, thanks to the full benefits of river networking with electromechanical draining and irrigation, the whole commune harvested a bumper crop, and grain output

increased by more than 20 percent over the bumper year of 1976. Yields were more than 10,000 jin per household, more than 1 ton per capita, and more than 1,000 jin per mu. Gross output doubled over what it had been in 1974 before river networking had been done, and the marketable grain rate reached 30 percent for first place in the county. Forestry, animal husbandry, sideline occupations and the fishing industry developed in an all-round way, and the commune became a pacesetter in farmland water conservancy construction in the lakeshore area.

In farflung river valley plains areas, simultaneous with high standards for further dispersal and shortening of dikes, high-quality dikes, and raising of standards to withstand floods should be an expansion of installed drainage and irrigation capacity to eradicate the flood-prone area. In places with a concentration of rivers and lakes, streams should be merged, curves removed to make streams straight, and the amount of cultivated land increased as feasible. Major efforts should be made to level the fields and to make garden-style fields that meet high standards over a large area, with the linking together of canals, forests and roads, and the separation of drainage and irrigation so that floodwaters do not enter fields so that fertilizer and water do not leave the fields, and so that irrigation is not done by channeling water along furrows for the transformation of inconsistently high-yielding fields into consistently high-yielding fields. The delta in the lower reaches of the Gan and Fu rivers, which is located in the southern part of this base, is the laggest plain in the province,[6] and also its main granary. With the region is an area of approximately 2 million mu of cultivated land, which is 5 percent of the cultivated land area of the whole province, and whose grain output accounts for 10 percent of the gross output of the whole province. Because of the ramshackle water drainage system that formerly existed, plus the uneven distribution of precipitation, flood, waterlogging, and drought disasters were frequent. Before liberation, water conservancy projects were in disrepair, so that each year when spring turned to summer and summer to fall, floodwaters from the Fu River flowed to the plain. In the area into which mountain torrents from Qingfeng Mountain poured, where the flood waters of the Gan River and the Boyang Lake collided to form reverse drainage, farmland on the vast plains of Nanchang, Jinxian and Fengcheng counties were inundated. Then, with the arrival of autumn when rainfall decreased and evaporation was great, the inland lakes became shallow and streams stopped flowing, causing serious drought disasters. Agricultural production was extremely inconsistent. In1958, the large Ganfu Plain water conservancy project was built, and by 1969 a total of 288 large and medium projects had been built, plus more than 1,000 small ones. Canals of all kinds totaling 1,500 km in length were dug, and the great dikes of the Gan and Fu rivers were repaired, increased in height, and thickened and flood-prevention dikes stretching 213 km. Built to standards

6 The Ganfu Plain irrigation area incluces Nanchang, Fengcheng, and Jinxian counties, plus suburban Nanchang City covering an area totaling approximately 2,000 sq km, of which the area of the plan accounts for 79 percent, low hills and downlands 9.1 percent, and lowlands, lakes, rivers and branches of streams 11.9 percent.

for floods such as occurred only once every 7 years, they guaranteed more than 1 million mu of farmlands within the dikes against incursions. Then a dam was built on the Ren River, and a new river bed dug in front of the dam to divert floodwaters from the Fu River eastward and to drain Qingfeng Lake into Boyang Lake. After the Fu River river bed was altered, the almost 50-km-long old river bed became devoid of water, and nearly 700,000 mu of lowlying lake fields were spared historical waterlogging disasters. Both flood-prevention dikes and navigation routes were shortened; various sizes of branch streams were excavated or dredged, and more than 300,000 mu of farmland was drained of waterlogging. The building of a dam to interdict the middle reaches of the Fu River at Jiaoshi in Linchuan County diverted the Fu River through two main trunk canals, and six canals irrigated 1.2 million my of farmland (diverting 157,000 m^3 of water). In addition, a large amount of water was transported for use in industry and in cities. Today the Ganfu Plain has a brand-new look, and agricultural production is steadily developing.[7]

Though construction of the Ganfu Plain project greatly improved drainage and irrigation conditions in the plain delta region and stimulated development of agricultural production, nevertheless inasmuch as the water level in canals is higher than the fields in an overwhelming part of the irrigation area, frequently the ground water table rises on both sides of canals. In addition, the raising of the water level in the Fu River north of the Jiaoshi Dam has caused some commune lowlands in Linchuan and Dongxiang counties on both shores of the Fu River in its middle reaches to become waterlogging-prone areas. Appropriate actions must be taken to find solution to this problem.

The threat of drought and waterlogging disasters exists not only on the Ganfu Plain, but also in the river valley plains of the Xin River, the Le'an River, the Chang River, the Jin River, and the Boyang River. These problems must be integrated, general methods suited to specific circumstances, comprehensive planning done, and overall control effected. In upper reaches ridged-field areas, the main thrust of the attack must be on the storage of water, on improvement of cold pasty fields and elimination of flood irrigation. On flat fields in the lower reaches, the land must be leveled and garden-style fields built on a large scale. Flood irrigation must be changed to furrow irrigation for the most part as the main thrust of attack. In addition, increasing the height and strengthening of river dikes is also very important.

7 Before the Ganfu Plain project was built, in 1957 Ithe maximum year for grain output), Nanchang County (not counting Nanxin and Jiangxiang districts) produced 140 million jin of grain and beans, including 404 million jin of paddy rice. After the project was built, in 1977 Nanchang County (not counting Nanxin and Jiangxiang districts) produced 749 million jin of grain and beans, including 746 million jin of paddy, which was an 81.7 percent increase over 1957.

Table 3-5. Maximum and Minimum Water Levels Over the Years at Major Water Level Stations in the Boyang Lake Region

Units: Meters
Elevation: Wusong Foundation Stone

表3—5　　鄱阳湖区主要水位站历年最高、最低水位特征

单位：米　高程：吴淞基石

站 a) 名		波 b)阳	康 c)山	都 d)昌	丰 e)城	星 f)子	湖g) 口
h)最高水位	高程	21.69	21.79	21.71	22.20	21.85	21.68
	时间	54.7.31	54.7.31	54.7.30	54.7.19	54.7.30	54.7.16
k)最低水位	高程	12.99	12.21	8.77	10.46	7.15	5.90
	时间	72.1.31	63.4.19	65.1.9	57.1.12	63.2.8	63.2.6
l多年平均		15.33	15.21	13.79	14.61	13.45	13.40
m水位变幅		8.70	9.58	12.94	11.74	14.70	15.78
h) 备注		o)自47—73年，共27年	p)自52—73年，共22年	p)自52—73年，共22年	系赣江水位，q)自53—66，68—73年，共21年，缺64年。	r)自53—73年，共21年。	s)自50—73年，共24年。

t)资料来源：《鄱阳湖水产资源综合报告》，1977年

Key:
- a) Name of Station:
- b) Boyang
- c) Kangshan
- d) Duchang
- e) Fengcheng
- f) Xingzi
- g) Hukou
- h) Maximum water level
- i) Height
- j) Time
- k) Minimum water level
- l) Multiple-year average
- m) Water-level change
- n) Remarks
- o) A total of 27 years between 1947 and 1973
- p) A total of 22 years between 1952 and 1973
- q) This is the level of the Gan River for 21 years 1953-1966 and 1968-1973, with the exception of 1964.

[Key for Table 3-5, continued]

r) A total of 21 years between 1953 and 1973
s) A total of 24 years between 1950 and 1973
t) Source of data: "Composite Report on Boyang Lake Aquatic Resources," 1977.

About half of the farmland area of this base is low hill region farmland. Here the downlands roll, and farmland capital construction requires the movement of large amounts of earth. At the same time, sources of water for irrigation frequently appear inadequate and the threat of drought is fairly great. In some red earth downland regions, in particular, water-storage conditions are poor, and sources of water and lake water are far away. The water diversion route is long; replenishment cannot be done promptly; and capabilities to fight drought are low. The potential of currently available water conservancy projects must be fully tapped, they must be better equipped. Medium and small reservoirs must serve as the mainstays, and canals and reservoirs must be linked in an effort to expand water storage and to increase the irrigation area. At the same time, energetic efforts should be devoted to improvement of red earth hillsides. For existing cold, waterlogged, low-yield fields, when supplies of irrigation water can be guaranteed, there should be large-scale use of one ridge and three ditches to minimize disadvantages and maximize advantages, eliminate mountain torrents, lower the water table, and thereby convert low-yielding fields to consistently high-yielding fields. Leping County stored 365 million m^3 of water for the irrigation of more than 350,000 mu of cultivated land, an average of more than 1,000 m^3 of stored water per mu, which substantially solved drought problems within the county. In 1979, grain yields for the county as a whole averaged more than 1,000 jin per mu. This provided experience for the building of water conservancy projects in hill and downlands plains areas.

In the course of farmland capital construction, numerous prefectures, counties, and communes took account of overall needs and did across-the-board planning that linked the upper and lower reaches of streams. They tackled in a comprehensive ways problems relating to mountains, water, fields, forests and roads, linked the long term and short term, and made sure in the course of their planning to work on projects providing big results, leaving small-benefit projects until later. They devoted attention first to concentrated grain- and cotton-growing areas, leaving scattered producing areas until later. They emphasized protection and completion of projects first, turning their attention to new construction later, clearly distinguishing priorities and planning comprehensively for greatest results from water conservancy construction projects. A look at specific circumstances in this base shows not only consideration of the relationship among the area around the lake, the plain, downlands and hills, but a crossing of county and commune jurisdictional lines to do unified planning for ridged fields in mountains as well as for flatland fields, coordinating all. They also did unified

planning with upstream agricultural regions in the province for proper handling of the relationship between upper and lower reaches. Using formulation of basinwide plans from the lower to the upper reaches and back as the groundwork, they next devoted attention to major conflicts resulting from the characteristics of individual regions to determine the main direction of attack. They suited general methods to specific circumstances to formulate farmland water conservancy construction plans for all kinds of regions.

Large-scale farmland capital construction also requires that one proceed from actual circumstances, take firm hold of administration and management, dovetail projects, and tap equipment potential in order to derive full results and gain relatively large economic results from a relatively small amount of manpower, material and financial resources. One problem that has existed everywhere in water conservancy construction during recent years has been doing things on too large a scale, long construction times, no dovetailing of projects, poor administration and management, low equipment-utilization rates, and inability to derive full design benefits. This has occasioned serious losses for the country, the people and agricultural production, and this situation must be corrected rapidly. The Baita irrigation canal project in Yujiang Province provided very good experience in scientific management, in the dovetailing of projects, and in tapping equipment potential. Construction of this project began in 1951 and linked harnessing of the waters, soil improvement and eradication of leeches and oncomelania with the building of a medium water diversion irrigation project. In 1958, this county eradicated schistosomiasis. To commemorate this achievement, Comrade Mao Zedong composed a poem titled, "Dispatching the God of Plague, a Poem of Eight Lines in Two stanzas," which acclaimed the revolutionary pioneering spitit of the people of Yujiang. During the past more than 20 years, the people of the irrigation district have done much to tap the project's potential, increasing the originally designed irrigation area from 72,000 mu to 180,000 mu by 1975. After smashing the "gang of four," they began to expand projects associated with the Baita new canal project. Upon completion, the irrigation area increased to 220,000 mu,[8] and grain yields for the irrigation area as a whole increased from the 190 jin per mu before building of the irrigation canal to 1,100 jin in 1977.

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8 Specific experiences gained from the building and management of the Baita irrigation canal were as follows: 1) a corp of more than 600 people for mass water control, formulation of irrigation principles and measures of "the distant first and the nearby later," and "all waters returned to the canal, and seeped water returned to the fields"; 2) changing dead spots unreached by water conservancy projects into places where water flows lively; 3) use of a small volume of flow to irrigate large areas; 4) scientific use of water, coordinating water, fertilizer and air to promote irrigation and drainage.

2. Firm Grip on Weak Links in Grain Production, With Main Attack Directed Toward Increasing Per Unit of Area Yields of Existing Fields

Grain yields per unit of area from this base are currently among the lowest for any of the old marketable grain bases in south China. In terms of area sown, yields amounted to only 400-odd jin per mu in 1979. Paddy yields averaged only 500 jin per mu, and wheat yields only 100-odd jin per mu. Clearly accelerated construction of marketable grain bases must start with an increase in yields per unit of area and steady increase in gross output, with increase in yields per unit of area forming the main direction of attack. The main ways of doing this should be as follows:

(1) Reform of the farming system and increase in the multiple-cropping area. The basic farming system used in this base today is as follows: green manure followed by two crops of paddy, the green manure area accounting for 66 percent of the cultivated land area, with only a small proportion of fields devoted to the growing of spring grain and rape, i.e., only about 9.3 and 7 percent, respectively, of the cultivated land area. This farming system played a very stimulating role in assuring a steady source of supply of fertilizer for the early paddy crop and increasing grain output during the early stages when growing of a single crop of paddy was changed to growing of two crops of paddy. However, long-term use of this undiversified farming system has led to a tendency toward decline in both quantity and quality of green manure. Surveys conducted in various places show that former fresh grass yields of 4,000 jin per mu have declined to between 2,000 and 3,000 jin per mu, and the nitrate content of fresh grass has dropped from 5 to 4.2-4.3 percent. In addition, the number of overwinter insects has increased resulting in an increase in diseases and insect pests. Furthermore, failure to turn the soil for long periods of time has meant a decline in its fertility. On the other hand, expansion of the area sown to spring grain and spring oil-bearing crops, with commensurate reduction in the area growing green manure would not only increase the soil-utilization rate and increase output of grain and oil, but would also regulate soil moisture and air, and be advantageous for increasing soil fertility. Experience in various places has shown that under present conditions contraction of the area sown to winter green manure to about 60 percent of the wetlands area, and an increase in both the wheat- and rape-growing areas by 10 to 15 percent is possible. In drought-prone hill regions lacking water, it will also be necessary to suit general methods to local situations for development of dryland grain production. Fengcheng County has achieved very good results in this regard in recent years, not only increasing output of miscellaneous grains such as wheat, soybeans, broad beans and peas, mung beans, small red beans, buckwheat and corn to satisfy market needs, but also increasing earnings of the masses.

(2) Increase in availability of fertilizer and increase in fertilization to gain high yields from every crop. Once water conservancy problems have been substantially solved, the main contradiction will be insufficiency of fertilizer for grain production. Today, most of this base's

fertilizer derives from green manure. For the late crop in a two-crop system, the main source is hog dung, chemical fertilizer, return to the fields of rice straw, and manure of miscellaneous origins. Overall, the level of fertilization is currently not high. For widely occurring red earth fields, in particular, which are lacking in organic matter, are highly acidic, and have a small nitrate, phosphate and potash content, it is even more important to take a firm grip on increasing fertilizer. Special emphasis should be devoted to the problems of sources of fertilizer for the late crop in a two-crop system. Late crop yields per mu are not high (averaging about 400 jin), and this is an important factor bearing on grain output for the year as a whole. Every available means must be used, and general methods suited to local situations to get fertilizer from mountains, to get fertilizer from waters, to intercrop green manure during summer, and to do large-scale composting in order to increase the amount of fertilization of the second crop, thereby setting the stage for increased yields.

Increased output of green manure and fresh grass is an important way of solving the fertilizer problem. Experiences of advanced units show that measures such as sowing as early as possible, dibbling of seeds to withstand drought, promotion of mixed sowings, strict attention to getting full stands, increased fertilization with phosphate and potash, use of phosphate to increase nitrate, returning of rice straw to fields, spreading manure during winter, draining and irrigating at the right time, protecting seedlings during overwintering, followup fertilization at the time of seedling emergence, use of small amounts of fertilizer to make large applications go farther, and use of organic fertilizer in place of chemical fertilizer can effectively increase yields per mu and output of Chinese milk vetch green manure.

It is also necessary to solve the Chinese milk vetch seed stock problem. This base is a region of the province that has a fairly high output of Chinese milk vetch seeds. Yujiang and Fengcheng counties have historically been accustomed to and have experience in the growing of Chinese milk vetch and seed stock. These counties' yields of milk vetch seed stock are high and quality is good. Variations are great from one county to another, however. Many counties still have to bring in milk vetch seeds from elsewhere. This wastes manpower, material and financial resources, and also increases costs and delays the farming season. In future, it will be necessary to suit general methods to local circumstances, make use of individual strengths, and do a good job of building bases for the growing of Chinese milk vetch seed stock in order to solve problems in exchanging and moving around within the region of Chinese milk vetch seeds to promote balanced increases in output. Chinese milk vetch seed stock fields should have arational pattern of distribution. Generally a spacious plot that receives plenty of sunlight, that can be readily drained and irrigated, and that is of moderate fertility should be selected. The site should be rotated every year. The area devoted to the growing of seed stock should generally be between 18 and 12 percent of the area sown to Chinese milk vetch during the current winter. Promotion of the growing of seed stock on mountain drylands in hill regions

should not compete with land for the early paddy crop. Diseases and insect pests should be reduced, and outputs of seed stock that are higher than from wetlands will help increase early paddy yields.

Large-scale growing of hogs and cattle to provide a source of more organic fertilizer to promote increased grain yields. This base is far below other south China commodity grain bases in the raising of hogs, and it is a very long way from meeting requirements in this regard of "The National Program for Agricultural Development." This not only reduces the supply of meat for markets and for export, but also hurts efforts to increase agricultural production. Results of a survey conducted by the Jiangxi Provincial Red Earth Experimental Station show a clear correlation between the number of hogs per mu of cultivated land and grain yields per mu. When hogs average 0.9 per mu, grain yields can exceed requirements of "The National Program for Agricultural Development." When hogs average 1.3 per mu, grain yields may reach 1,000 jin per mu.[9]

It should be pointed out that in the raising of hogs some counties and communes still following the bad practice of allowing hogs to run loose and forage. Not only does this waste a large amount of fine-quality organic fertilizer, but it also leaves hogs very open to epidemic diseases. By contrast, some counties and communes (or farms) that devote much effort to hog raising have been able to solve the problems of fodder, sow fecundity and prevention of epidemic diseases by making sure to pen hogs and collect dung. Vigorous efforts at collective hog raising have also scored remarkable results. The Hongxing provincially administered land reclamation farm in Dongxiang County was formerly a barren red earth mountain. For many years, this farm has proceeded from realities, has suited general methods to local circumstances, and has persevered mostly in the raising of hogs to improve the red earth. This has given powerful impetus to large-scale development of agricultural and industrial sideline production. In 1977, this farm averaged more than one hog per mu of cultivated land, and more than three head per capita. It provided the state with more than 10,400 head for the whole year, and grain yields rose from 200 to 300 jin per mu to more than 1,110 jin. A survey done at the farm's Siqian branch farm (1972-1973) showed a correlation among hogs, manure, and grain, which is shown in Table 3-6: (1) in production teams having fewer than one hog per mu, paddy yields were 600-odd jin per mu; (2) for production teams having between one and 2 hogs per mu, lrain yields were between 800 and 900 jin per mu; (3) for production teams having more than two head per mu, grain yields were more than 1,000 jin per mu.

A look at current realities in this region shows that hastening development of the hog industry requires strong emphasis on sow reproduction, building of fodder bases and training of veterinaries. Most important is encouragement of private hog raising by commune members, plus close attention to development of collective hog raising. In cities, prefectures and counties, and on state-owned land reclamation farms having requisite conditions, mechanized, and semimechanized hog farms should be built.

9 "Jiangxi Red Earth Research," Third Edition, December 1975.

Table 3-6. Statistics Showing Correlation Among Hogs, Manure, and Grain at Siqian Branch Farm in 1972-1973

表3—6 1972—1973年寺前分场猪、肥、粮相互关系统计

项目 a) \ 生产队 b) \ 年份 c)	1972年							
	1	2	3	4	5	6	7	d) 综合队
e) 每亩耕地生猪饲养数（头）	0.56	2.1	1.4	0.75	1.2	0.9	4.6	2.6
f) 每亩肥料施用数量（担）	16	60	42	22	36	27	100	80
g) 每亩粮食产量（斤）	622	890	780	686	724	758	1195	青饲料年产量 30000斤 h)

项目 a) \ 生产队 b) \ 年份 c)	1973年							
	1	2	3	4	5	6	7	d) 综合队
e) 每亩耕地生猪饲养数（头）	0.65	1.6	1.0	0.7	1.5	0.65	2.3	17.2
f) 每亩肥料施用数量（担）	20	50	30	23	45	20	70	100
g) 每亩粮食产量（斤）	634	928	853	651	870	884	834	1245

i）说明：1973年6队发生猪瘟，猪田比例较72年下降0.25头，但稻谷却增产1成，其原因是综合队调出一批猪粪支援了该队。资料来源：《江西红壤研究》第二辑

Key:
- a) Particulars
- b) Production team
- c) Year
- d) Composite production team
- e) Number of hogs raised per mu of cultivated land (head)
- f) Amount of fertilization per mu (dan)
- g) Grain yields per mu (jin)
- h) Annual green feed output, 30,000 jin
- i) Explanation: In 1973, hog cholera broke out in Sixth Brigade, and the ratio of hogs to fields declined from 1972 to 0.25 head per mu. However, paddy output increased 10 percent because the Composite Brigade provided hog manure to help that brigade. Source of data: "Jiangxi Red Earth Research," Second Edition.

Energetic development of the chemical fertilizer industry, and an increase in the amount of chemical fertilization. The amount of fertilizer used in each of the counties in this base today is far lower than in any commodity grain base in south China. This region has fairly plentiful mineral resources for making fertilizer, especially coal resources, which are found in nearly one-half of its counties. It also has fluorite, limestone, dolomite and pyrite, all of which are suitable for development of a local chemical fertilizer industry. Currently, there are several province-, prefecture-, and county-operated nitrate fertilizer plants and nine phosphate fertilizer plants in counties in the base, which makes a pretty good start. Problems with insufficient electric power and incomplete equipment have to be genuinely solved, and vigorous efforts must be made to improve the labor productivity rate to produce more chemical fertilizer and satisfy needs for development of agricultural production within the region. The state should also provide needed support in these regards.

Active promotion of the return of rice straw to the fields, growing of red azolla, and use of ammonium humic acid are effective ways in which to solve the problem of fertilizer for the late crop. A return to the fields of between 30 and 50 percent of rice straw would be satisfactory. Red zaolla is highly adaptable, reproduces fast, has high yields and makes effective fertilizer. A single mu of red azolla is enough to fertilize 10 mu of the late crop, and it should be used as an important way in which to solve the late crop fertilizer problem.

(3) All-round implementation of the "Eight-Point Charter" for agriculture, and upgrading of scientific farming standards. Since liberation, scientific research on agriculture has made very great strides in each of the counties of this base, and scientific farming standards are improving daily. However, in an overall sense, they are still a long way from being able to meet needs for high-speed development and hastening the building of commodity grain bases. In the future, it will be necessary to make full use of agricultural science research organizations and the fairly plentiful technical forces within the base area to proceed from realities to hasten development of agricultural research endeavors, and to focus on all-round implementation of the "Eight-Character Charter" for agriculture, emphasizing attention to the breeding and promotion of superior varieties. Vigorous efforts should be made to improve the red earth, to reform the farming system, to promote the growing of seedlings in hot houses, to hold firmly to reasonably close planting, to manage water use scientifically, to intensify plant protection work for good performance in prevention and control of diseases and insect pests; to summarize and promote conscientiously advanced planting techniques, steadily upgrading the level of scientific farming and makine major efforts to increase yields per unit of area.

There should be further building and strengthening of scientific agricultural research organizations, counties having agricultural research institutes, communes having agricultural technology stations, and

production brigades having scientific agricultural teams (or units) for widespread development of a mass movement of scientific experimentation. Typical cases may be selected from different kinds of agricultural regions to conduct scientific experiments and to establish models to help promotion and application.

3. Regions Having Requisite Conditions Should Clear Wastelands To Expand Cultivation and Increase Cultivated Land Area

Among all the commodity grain bases in the provinces of south China, this region is one that has an appreciable amount of cultivated land. Nevertheless, in terms of the amount of cultivated land per capita, it averages less than the national 1.6 mu per capita. The amount of land newly brought under cultivation since liberation through enclosure of parts of lakes and the clearing of hill wasteland has not kept pace with the amount of cultivated land that has been steadily taken over for industries, mines, transportation, cities and towns, and the building of farmland water conservancy. The trend has been toward yearly decline in cultivated land area. In order to meet needs in building the national economy so that this commodity base will make a greater contribution to the country, simultaneous with a change in agricultural production conditions, reform of the farming system, institution of scientific farming, and vigorous efforts to increase yields per unit of area, it will be necessary to reclaim wastelands and increase the cultivated land area as feasible.

According to data provided by units concerned, there are approximately 1 million my of wasteland slopes that have been not used. These wastelands are located in Anyi, western Xinjian, Gao'an, Fengcheng, Dongxiang, southern Linchuan, and northern Boyang counties at an elevation of less than 100 m above sea level, with a relative elevation of 20 to 30 m, and with a slope of less than 10 degrees. Vigorous efforts should be made to improve water conservancy conditions, to increase investment in farm machinery, and to reclaim this wasteland for use in a planned way so as to increase output of grain and other cash crops, and to increase the commodity rate. However, bringing these wastelands under cultivation will require all-round planning with concurrent attention to the relationships among farming, forestry, animal husbandry, sideline occupations and the fishing industry, and between grain crops and cash crops. It will be necessary to suit general methods to specific circumstances, make rational patterns, use for agriculture and land suited to agriculture, use for forestry and land suited for forestry, use for animal husbandry, the land suited for animal husbandry, and use for fisheries the land suited for fisheries. Inasmuch as the Boyang Lake Plain is a seriously timber-short region of the province, special attention should be given to the protection of existing forest resources when bringing this wasteland under cultivation; the destruction of forests to clear land for agriculture should be resolutely opposed. It is necessary to make sure that reclamation is linked to water and soil conservation, and that mountains, water, fields, forests and roads become part of a unified plan for all-round development of farming, forestry, animal husbandry, sideline occupations and fisheries.

As for reclamation of lakeshore areas for agricultural use, inasmuch as more than 1 million mu of land has already been reclaimed from lakes since liberation for establishment of numerous state-owned farms and land reclamation farms, the present area at an elevation above 16 m that remains to be reclaimed is rather small, and most of it is scattered here and there. Though there are more than 400,000 mu at an elevation of 14 to 16 m that has not been reclaimed, most of it is grassy flats, and were these to be reclaimed, conflicts would arise with the draining of floodwaters from the lake region, with catches of aquatic products and with the grazing of livestock. Land below 14 m is lowlying flats, which are widely covered with reeds, individual places having thin grass or sandy soil. Though the area is large, the terrain is low; most of it is marshy; and it is difficult to reclaim for agriculture. Thus, large-area reclamation in the Boyang Lake region is no longer feasible. Where reclamation is required in a few places, it will also be necessary to follow the principles of suiting general methods to local situations for multiple use, unified leadership, comprehensive planning, and achieving all-round development of farming, forestry, animal husbandry, sideline occupations and fisheries. In addition, concurrent attention will have to be given to guarding against schistosomiasis, to water conservancy and to navigation. Depending on circumstances in individual counties, it will also be necessary to leave some grassy flats to provide fuel for the masses and for use as fertilizer. Grassy flats that are fairly low should be used for development of reed production to satisfy needs in the province's papermaking industry.

4. Establishment of a Rational Agricultural Economic Structure for All-Round Development of Farming, Forestry, Animal Husbandry, Sideline Occupations and Fisheries so That Farming and Industrial Sideline Occupations Become Mutually Reinforcing

The need for commodity grain bases to emphasize a firm hold on grain production in order to provide more commodity grain to the country is, without doubt, extremely important; however, a large body of facts demonstrates that commodity grain bases cannot be undiversified. Attention to grain alone means tight money and a shortage of funds, which causes numerous conflicts. Not only is grain production unable to advance very rapidly, but a vicious cycle usually results. Only through all-round development of farming, forestry, animal husbandry, sideline occupations and fisheries, mutual advancement of farming and industrial sideline occupations, firm attention to economic diversification, opening of wide avenues for the creation of wealth, and having funds is it possible for grain production to rise more rapidly and better. Within this base area are plains, hills and lakes and streams; natural conditions are extremely superior, and vast prospects exist for development of economic diversification. In the future, it will be necessary to suit general methods to specific circumstances, make the most of strengths, remove weaknesses and lay all-round plans for cash-crop, forestry, animal husbandry, sideline occupation and fishery production even while devoting vigorous attention to grain output. It will be necessary to take the road of combined development of agriculture and

and industrial sideline occupations and to build as required in order to overcome the current lack of diversification in the agricultural economy, to build weaknesses into strengths and to combine advantages and disadvantages so that agriculture flourishes and the peasants become rich.

Commune and brigade enterprises in all counties making up the base are on a shaky foundation. Gross earnings of commune and brigade enterprises account for approximately 25 percent of gross earnings for the three-tier commune economy. Insofar as conditions and possibilities in each jurisdiction permit, future action will have to be taken to hasten development of commune and brigade enterprises. Mostly, major efforts will have to be made to develop the farming and breeding industries, to gradually expand agricultural and sideline products processing industries, to actively develop local construction industries, such as cement, lime production, bricks and tile, and sand and stone. There should be active development of cooperation between cities and countryside following the principle of economic cooperation under guidance of the state plan. The financial and trade sector can also decentralize rural grain, cotton, oil, fruit, tea, poultry, and aquatic products processing industries to commune and brigade management so as to increase commune and brigade cash income and promote the building of commodity grain bases.

5. Large-Scale Development of Farm Machines To Increase Levels of Mechanization

It is necessary to quicken the pace of agricultural mechanization in order to hasten development of agricultural production in the base, to raise the marketable products rate, and to bring about the modernization of agriculture. This is also the road that must be followed for fundamental emancipation of the labor force and to increase the agricultural labor productivity rate. This region has vast plains and a flat terrain. The gradient of hill slopes is slight, ranging from around 3 to 5 degrees, suiting large areas to mechanized operations. However, as a result of the historical legacy of a small-scale economy, many field plots are at different elevations, are of different sizes, and have ridges running every which way. It will be nece'sary to combine the building of garden-style fields with energetic leveling of the land to set the stage for large-scale mechanization.

A look at the region's microtopography and soil quality shows large and medium farm machines suitable for promotion and use in this region. For hillsides and fairly small wetland plots, small, light-weight, simple, easily operated and reliable cultivation machines and implements may be used. Wet-field tractors may be promoted and developed on an experimental basis.

Farm and tractor spare parts production remains a weak link in farm machine industrial production in this region, and it must be improved. Counties, communes and production brigades will have to set up a trilevel farm machine building and repair network. They will have to improve

tractor maintenance, establish necessary rules and regulations, organize production in a rational way, and increase farm machine utilization rates.

2. Problems in an Equitable Pattern of Cotton Production and in Building Bases

A. Current Situation and Major Problems

This region has plentiful heat resources and fertile soil. Its natural conditions are extremely favorable for development of cotton production. In 1979, a 1,326,000 mu area of the region was sown to cotton. This was 31.5 percent of the total area of the region sown to cash crops, and 87 percent of the total area sown to cotton in the whole province. Today the province's three main cotton-growing areas are all concentrated in this region. This includes Pengze and Xinyu counties, both of which have a more than 100,000 mu cotton-growing area; Boyang, Duchang and Gao'an counties, which grow almost 100,000 mu; and Jiujiang, Hukou, Fengcheng, Jinxian, Ruichang, Linchuan and Leping counties, each of which has a more than 50,000 mu growing area. The status of cotton production in this region has a major impact on development of the whole province's cotton textile industry.

The region's cotton output has developed very rapidly since liberation, but development has not been consistent. It has gone through serious ups and downs. In a nutshell, the main current problems with cotton production are as follows: Lack of serious thinking, failure to implement policies, irrational crop patterns, and failure of cottonfield capital construction to come up to standards. This has been manifested in the following ways:

1. Stressing grain production while slighting cotton production, grain production crowding out cotton production. As a result of the turmoil and destruction caused in past years by the ultraleftist line of Lin Biao and the "gang of four," some counties and communes one-sidedly emphasized grain production, relegating cotton production to a subordinate position. The stress on grain production and the slighting of cotton production, with grain production crowding out cotton production was very serious. In planning crop areas, numerous counties and communes failed to grow as much cotton or to grow it as well as plans handed down by the state required. Everywhere a situation existed of reporting a larger than actual cotton-growing area. Many communes and brigades grew grain on fine land and grew cotton on poor land. They also put cotton behind grain in the assignment of the labor force, funds and fertilizer. In addition, inequitable comparative prices paid for cotton and grain and overly low grain-ration standards for cotton-growing areas hurt the enthusiasm of cotton farmers.

2. Cotton field crop patterns are not rational. Cotton is a cash crop with a fairly high marketable product rate, and one that places fairly strict demands on natural, technical and economic conditions. Its production pattern must follow the principle of "rational distribution and proper concentration." In stressing grain production while slighting cotton production, some counties and communes currently give no consideration to natural, economic and technical conditions when planning cottonfield crop patterns. They do not suit general methods to specific circumstances, adopting instead a uniform method of apportioning cottonfield area, which results in too much dispersal of the cottonfield area. This is one important reason why cotton production has fluctuated for a long period of time. Today the cottonfield area in each of more than 10 counties throughout the region is below 50,000 mu, and the total area is approximately 240,000 mu, which is 18.3 percent of the whole region's total cotton-growing area. Even in current key cotton-producing counties, quite a few cottonfields are rather dispersed. Statistics for 1978 from Fengcheng, Gao'an, Qingjiang and Xinyu counties show 1,954 production teams to have grown cotton, and more than 500 of these production teams, which was 27 percent of cotton-growing production teams, had a cottonfield area of fewer than 10 mu. Because cotton area quotas were not implemented, and since technical measures did not keep pace, both yields per mu and gross output were very low. The state plan could not be fulfilled year after year. Take the situation in Gao'an County for example, where 880 production teams grew cotton in 1976 with 33 of them selling no ginned cotton to the state. During that same year, 18 cotton-growing brigades in Fengcheng County, and 300 cotton-growing production teams in Qingjiang County did not sell even a single jin of ginned cotton to the state.

In addition to the foregoing problems with crop patterns for cotton production, as a result of the overconcentration of cottonfields in a small number of communes and brigades, numerous new conflicts arose. Some examples follow: When there are too many cottonfields and too few grain fields, there is not enough grain, requiring imports from elsewhere. When grain supply standards are overly low, grain rations of commune members are inadequate. When little unprocessed grain is brought in and there is a lot of husked rice, the amount of fodder available for feeding livestock diminishes greatly and it becomes difficult to raise cattle and hogs. When too much chemical fertilizer is used and there is a shortage of organic fertilizer, the soil becomes leathery and costs increase. When much cotton is grown continuously with little crop rotation, soil fertility falls,[10] and this hurts cotton quantity and quality.[11]

10 Measurements of the soil's nitrate, phosphate and potash content made by the Pengze County Institute of Agriculture show only 4.5-7.5 jin of pure nitrate, 4.6-10 jin of phosphate, 8-12 jin of potash, and somewhat more than 1.5 percent organic matter per mu.

11 A survey of Humian 204 variety cotton done by the Pengze County Institute of Agriculture provided the degeneration shown in the following table:

3. Lack of strict technical measures, particularly poor farmland capital construction and weak capacity to withstand disasters. Cotton grown on flats along rivers and on lakeshore plains is frequently waterlogged. The soil becomes leathery; temperature is low and humidity is high; and cotton diseases and insect pest infestations are serious, with the result that a large number of seedlings die. In 1977, for example, torrential rains fell continuously during the last 10 days of April in Pengze County, and cottonfields there became seriously waterlogged. In some places the number of missing or dead seedlings ran as high as more than 90 percent. Four or five replantings required the amount of seeds used in 3 years for a single year. A full stand of cotton was not attained until early June. Late development meant low yields and a 20 percent reduction in output for the whole province. The red earth hill drylands, on the other hand, are extremely drought-prone. In Jinxian County, for example, 90 percent of the 100,000 mu of cottonfields are found in red

[Footnote continued from previous page]

项 a) 目	b) 主根	c) 株高	d) 单铃重	e) 铃壳重	f) 衣分	g) 纤维长度	h) 百铃重	i) 种子重
j) 原种	k) 深	l) 1.17米	m) 5.8克	—	39—40%	n) 31毫米	o) 520克	p) 8.9克
q) 退化	r) 浅	s) 0.85米	t) 3—4.8克	u) 1克	33—38%	v) 29—31毫米	w) 300克	x) 9.8克

Key:
a) Particulars
b) Main root
c) Plant height
d) Weight of single boll
e) Weight of boll husk
f) Ginning outturn
g) Fiber length
h) Weight of 100 bolls
i) Seed weight
j) Stock variety
k) Deep
l) 1.17 m
m) 5.8 grams
n) 31 mm
0) 520 grams
p) 8.9 grams
q) Degeneration
r) Shallow
s) 0.85 meters
t) 3-4.8 grams
u) 1 gram
v) 29-31 mm
w) 300 grams
x) 9.8 grams

earth hills and downlands, more than half of which have no irrigation facilities. Cotton plants are stunted; bolls are few, and yields low. During the bumper harvest year of 1979, cotton yields amounted to only 39 jin per mu. In addition, there is a shortage of fertilizer; insufficiently serious attention is given to selective breeding of varieties; and management is poor--all maters deserving serious attention.

B. Rational Cottonfield Patterns and Problems in Base Construction

1. Views on Rational Crop Patterns. A look at cottonfield production in terms of requirements for natural, technical, and economic conditions shows that the following several factors must be taken into consideration with regard to cottonfield patterns: (1) Meteorological conditions for cotton growth and development. Generally speaking, cumulative temperatures of more than 3,000°C are required, plus a relative humidity of about 50 percent, between 9 and 10 hours of sunshine daily, and between 500 and 600 mm of water (on leaf surfaces and among plants), 15 percent of it during the sprouting period, 20 percent of it during the budding period, 40 percent of it during the flowering and boll-formation period, and 25 percent of it during the boll-opening period. Such conditions provide a fine environment for cotton growth and development. (2) Soil conditions. Suiting general methods to local circumstances to arrange the percentage grown on the basis of soil, water and fertilizer conditions, structural characteristics, soil quality and pH. Generally speaking, neutral pH sandy soil is best for the growing of cotton. Counties having a large proportion of drylands should also give due consideration to increasing the ratio of cash crops. (3) Condition of labor force. Cotton is a cash crop that is very demanding of techniques. It takes a fairly large work force. Given present technical levels, each member of the work force should be responsible for between 3 and 4 mu of cottonfields. Overburdening of the work force will result in slapdash farming and yields per mu will not be high. (4) It is necessary to do whatever will increase crop yields and the commodity rate, and it is necessary to regulate in an equitable way the relationship between grain crops and cash crops as well as the proportions of various cash crops. In any given county, and particularly in any given commune and brigade, one should not try to be "all-embracing in all things." It is necessary to take all conditions and characteristics as a whole and to select one or two crops as the main direction for attack to conduct specialized production.

Recommendations on the Direction of a Rational Crop Pattern for Cotton Production In Terms of the Region's Realities

(1) Revival and development of cotton production in Jiujiang Prefecture. Stabilization of the existing cottonfield area, taking increase in yields per mu as the key element, with expansion of the area as feasible in places having requisite conditions. In De'an and Yongxiu counties, in particular, conditions exists for the opening of new cotton bases and such action is feasible once the Tuolin irrigation zone has been built.

(2) Suitable increase in the cottonfield area to the east, south, and west of Boyang Lake, and increase in the proportion of cash crops. In Boyang, Leping, Wannian and Yugan counties at the present time, the cash-crop-growing area runs between 15 and 18 percent of the total cultivated land area except for the cash-crop area of Boyang County, which takes up more than 20 percent (exclusive of rape). The area growing cash crops can thus be expanded further, and part of this can be for the growing of cotton. South and west of Boyang Lake, including Nanchang, Xinjiang, Fengcheng, Gao'an, Qingjiang, Xinyu, Linchuan and Jinxian counties, land is plentiful, and conditions also exist to set the stage actively for gradual increase in the cottonfield area. In individual counties and among communes and brigades, the principles of suiting general methods to specific circumstances, and suitable concentration should be followed for equitable readjustment of cotton crop patterns. In some communes and brigades in which the area allocated to the growing of cotton is very small, yields very low, and the area not really suited to the growing of cotton, consideration should be given to a change of direction to reduce the cotton-growing area and to develop specialized production of cash crops suited to conditions in the communes and brigades and for which a basis exists.

2. Orientation of base construction

(1) Active promotion in cotton-growing areas of winter farming in a "three three system." By winter farming in a "three three system" is meant the growing of one-third wheat, greem manure, and oil-bearing crops in a crop-rotation system. This is the traditional farming system of this region. Institution of a "three three system" of winter farming can effectively maintain soil fertility and set the stage for bumper cotton harvests year after year. High yields of wheat (or rape) can also be harvested. However, in recent years, there has been too large an area intercropped with cotton and wheat in quite a few communes and brigades. The land has been used without consideration given to its nurture, and fertility has declined markedly. Both cotton and wheat yields have fallen, and this situation must be turned around as quickly as possible.

(2) Simultaneous wetland and dryland cotton-growing regions, with vigorous promotion of cotton and paddy crop rotation. To the east, south and west of Boyang Lake, in particular, the soil's potential is great; yet the cottonfield area is currently relatively small. Even if great efforts are made at further development in the future, it has all the conditions for promotion of cotton and paddy crop rotation (i.e., rotation between wetlands and drylands). Either 3 years of cotton and 2 years of paddy, or 5 years of cotton and 3 years of paddy would be best. This would reduce water leakage from paddyfields and use of labor on dilficult-to-maintain cotton stands. At the same time, it would help the conversion of soil nutrients, reduce weeds, diseases and insect pests, and promote high yields of both cotton and paddy.

(3) Mastery of climatic patterns, sowing in the proper season, improving management and increasing yields. Early sowing of a full stand is the first obstacle to be overcome in securing high yields of early ripening cotton. In this region, cotton is usually sown in mid-April, and it sprouts during the last 10 days of April. It is precisely at this time that much spring rain falls; there is little sunshine, and temperatures are low, leading to the rotting of seeds and seedlings. Experience everywhere has shown that if a full stand is to be obtained, it is essential that seeds be processed properly, that seeds be selected well, that the land be prepared ahead of time, that fertilizer be worked into the soil, that the soil be hoed lightly for the sowing of seeds, and that deep ditches be dug to drain away stagnant water. Much rain during the seedling stage causes weeds to grow. Problems with diseased seedlings, weak seedlings, or late developing seedlings must be watched so as to get early development of full, even and sturdy stands. During the budding stage, moderate fertilization for budding and heavy fertilization for flowering must be given. Deep cultivation must be done to increase budding and the number of bolls. The boll-formation stage (after full flowering), is the time of midautumn drought when temperatures are high. This is the time for topping cotton plants and providing topping fertilizer, to irrigate against drought, and to solve problems with premature waning and late ripening to achieve early ripening without early plant deterioration. In years of heavy autumn rains, pruning during the late season must also be watched to guard against diseases and kill insects, and to pick rotting bolls as quickly as possible so as to increase the quantity and quality of cotton.

(4) Suiting of general methods to specific circumstances for vigorous improvement in production conditions at cotton bases. In numerous counties in this region, only approximately one-half of the cotton-field area can deliver a crop despite drought or waterlogging. If production conditions in cotton-growing areas are to be changed rapidly, it is necessary to suit general methods to specific circumstance in major farmland capital construction. Efforts should be made so that cottonfields along the Yangtze River can be both irrigated and drained through separate drainage and irrigation systems. In cotton-growing areas around the lake, usually it is waterlogging rather than drought that must be guarded against, so farmland capital construction here such emphasize the eradication of waterlogging disasters. Conversely, in hill region cotton-growing areas, large-scale work should be done to make hilltop flatlands, and solution to the problem of fighting drought with irrigation should be the principle direction of attack in farmland capital construction. Places having requisite conditions may develop spray and drip irrigation. It will also be necessary to strive to end the insufficiency of fertilizer for the farflung cotton-growing areas, and particular efforts will have to be made to increase applications of organic fertilizer. The experience of some advanced units shows that for ginned cotton yields of 100 jin per mu, a minimum of 3,000-plus jin per mu of superior quality pig sty manure is required. If green manure is used, 300 jin will be required. Alternatively 100 jin of cake

fertilizer may be used. The raising of hogs in pens for collection of their manure, and widespread growing of green manure must be vigorously encouraged. Jiangxin Production Brigade at the Xintian reclamation farm in Jiujiang County successfully experimented with the growing of false hemp [crotolaria juncea], scoring fine results significant enough to be promoted. Efforts should also be made to increase the kinds of chemical fertilizers used, with attention to increased use of phosphate and potash.

(5) Strengthening of scientific research on cotton and practice of scientific cotton growing. Emphasis should be placed on cotton research and on summary of laws governing high cotton yields, as well as on growing techniques, prevention and control of diseases, insect pests, and weeds. Major efforts should be made to grow superior high-yield varieties suited to natural conditions in this region. Study should be made of equitable proportions of cotton and grain to be grown in areas where cotton is heavily grown (bases), on the mechanization of cotton-growing areas, and on scientific cotton care to win high cotton yields.

3. Problems in Development of Oil-bearing Crop Production

B. General Statement on Development and Distribution

This agricultural region is both an important grain- and cotton-producing area of the province and also its most important production area for oil-bearing crops. How well oil-bearing crops do in this region has a major impact on the whole province.

Rape and sesame are this region's main oil-bearing crops, followed by peanuts. A look at the regional pattern for oil-bearing crops in the area as a whole shows definite differences. The northern cotton- and grain-growing region provides the largest amount of marketable oil. Rape is the main oil-bearing crop in this region, accounting for between 70 and 80 percent of the total area sown to oil-bearing crops. East of Boyang Lake and on the Ganfu Plain, sesame and rape are equally important, and the percentage of peanuts grown is also higher than in the north. These differences reflect not only historical factors, but also differences in natural and socioeconomic conditions from one area to another. In the north, there is a lot of alluvial sandy soil, and though the cottonfield area is large, the growing of sesame and peanuts is limited. However, the region provides a lot of cottonseed oil, so the amount of marketable oil it provides is large. East of Boyang Lake and on the Ganfu Plain, there are many red earth drylands, and the cottonfield area is small. A fairly large amount of rape, sesame and cotton is grown. The growing of sesame is customary on the red earth low hill drylands of Boyang and Jinxian counties around Boyang Lake. In 1979, these two counties sowed 317,000 mu of sesame, which was 38 percent of the whole region's sesame-growing area, and 30.5 percent of the whole province's sesame-growing area. It accounted for 38.4 percent of the area's and 31.3 percent of the province's sesame output. In this region, sesame usually alternates with soybeans, that is to say that once the early soybean crop has been harvested, a crop of late sesame is sown.

B. Major Problems and Recommendations on Orientation

1. Active Measures for Major Increases in Yields Per Unit of Area

Like other cash crops, such as cotton, yields of oil-bearing crop per unit of area and outputs are low and inconsistent. This is a major contradiction in this region's production and development of oil-bearing crops. In 1979, rape yields for the whole region averaged 66 jin per mu, sesame averaged 74 jin per mu, and peanuts averaged 154 jin per mu, none of which was a return to all-time highs. Among the counties within the region as well as between one commune and brigade and another, a very great disparity also exists. In 1977, for example, the Xiangtang Commune Institute of Agricultural Science in Nanchang County had yields of 161 jin per mu from 112 mu of rape; Nanmen Production Brigade in Dongfanghong Commune, Gao'an County grew rape-paddy-paddy as three consecutive crops for rape yields averaging 185 jin; and in Xinjiang County, some field plots produced yields as high as 250-odd jin per mu of rape. Meanwhile, during the same period numerous communes and brigades having more or less the same conditions had yields of only 20 jin per mu, which is to say that very great differences exist in yields within the same area over the years. In 1952, Jiujiang County had rape yields reaching 70 jin per mu for first place in the province. In 1965, yields rose to 101 jin, only to decline to 68 jin in 1976, and then rise again to 101 jin in 1979. For more than 10 years, yields fluctuated without advancing. A similar situation exists for sesame and peanuts. This shows that active measures for a vigorous increase in yield per unit of area should be the main direction of attack to increase yields of oil-bearing crops in this region.

This region's rape-growing area reaches more than 1.65 million mu, which is more than 60 percent of the total area sown to oil-bearing crops. The key to improvement in yields of oil-bearing crops lies in improving rape yields per mu, and the principle measures for doing this are as follows:

(1) Growing of sturdy seedlings of superior varieties and promotion of the growing of seedlings for transplanting. According to an old adage, "sturdy seedlings make 30 percent of the harvest, and spindly seedlings lose half the harvest." Growing of seedlings for transplanting makes it possible both to assure planting on time, and also helps development of sturdy seedlings. The preceding crop can also be harvested normally, and thus rape output can be increased. It is a fine way in which to solve the problems of one growing season conflicting with another and competition for the labor force. The traditional direct planting method is retained for an overwhelming majority of the rape grown in this region today, and seedlings are small and spindly, pods are small, grains are small and yields are low. This situation must be changed as quickly as possible.

(2) A firm grip on winter care to promote steady growth and fast development. Sturdy superior-variety seedlings from the basis for bumper output, and scientific care is the key to bumper crops. Winter care is particularly important, and is of major significance in increasing rape yields. Winter-grown rape is strongly resistant to cold; it has good vegetative growth, a well-developed root system, numerous green leaves, a large leaf surface, strong ability to photosynthesize and it makes and stores a large amount of material. Good winter care means marked increase in branches and pods, and increase in grain weight for markedly increased yields.

(3) Sensible fertilization and timely cultivation. During growth and development, rape requires large amounts of fertilizer, so sources of fertilizer must be expanded. Strenuous efforts must be made to pen hogs to collect manure, and natural manure must be produced on a large scale. Fertilization must be done sensibly and scientifically. Since this region's paddyfield soil generally contains little phosphate, fertilization with phosphate produces markedly increased yields. In addition, rape is extremely sensitive in its need for boron. However, the red earth hill paddy fields in this region have a relatively low boron content. Experiments conducted by the Provincial Academy of Agricultural Sciences show a mixture of 1 liang of boron crystals in 100 jin of water sprayed once during the time when rape opens and when it branches produced a 111 percent increase in yields as compared with control plots. General methods should be suited to local circumstances for promotion of this finding.

(4) Harvesting on time for bumper yields and a bumper crop. April and May each year is the season when rape ripens. Usually much rain falls at this time; there is much wetness and clear days are few. If care is poor, harvested rape will frequently germinate, and this will both seriously impair yields and the oil yield rate. On the other hand, if late-ripening varieties are harvested too early, the per thousand weight of seeds may decline as a result, for a decline in rapeseed yields. Furthermore, the rape harvest season conflicts with the season for transplanting early rice and sowing cotton, and competes for the same manpower. Thus, rational planning must be done for on-time harvesting to achieve bumper yields and a bumper crop. Attention should also be given to the selection and promotion of early-ripening, high-yield superior varieties.

2. Suiting of General Methods to Local Situations, Equitable Crop Patterns, and Proper Expansion of Area of Oil-Bearing Crops

In 1979, 2,739,000 mu in this region was sown to oil-bearing crops, and this was less than the all-time high. If this regionis to be built into a major marketable oil base in the province, the area of oil-bearing crops will have to be expanded. This region has a relatively large amount of wastelands; its multiple-cropping index is not high, and the soil utilization potential is still very great. Expansion of the area sown to oil-bearing crops is entirely possible.

(1) Emphasis on expansion of the rape-growing area, and stabilization of the area growing sesame and peanuts. Expansion of the rape-growing area does not compete with grain for land, and it helps improve the soil. It also provides large amounts of superior-quality rapeseed-cake fertilizer. Moreover, relatively speaking, expansion of the area growing sesame and peanuts would compete much more with cotton and grain for cropland, fertilizer and manpower. Therefore, in terms of speeding up the building of oil-bearing crop bases, emphasis should be on expansion of the rape-growing area. Rape-growing patterns must suit general methods to local situations. In places in which the growing of cotton is concentrated, the winter rape area can be as much as about one-third of the total area sown, a "three three system" being used. In paddy-growing areas that grow two consecutive paddy crops, the growing area for winter rape may be gradually increased to between 15 and 20 percent from its present approximately 10 percent. This will mean that each household will be required to grow about 1 mu of rape.

(2) Development of the intercropping of forests with oil-bearing crops to increase output of woody oil-bearing crops. This region has many hill wastelands suitable for forests, and potential is great. Use of a portion to expand intercropping of forests with oil-bearing crops would not only increase output of edible oil and increase income, but would also be extremely beneficial for improved use of hill wastelands. In low mountain regions, the growing of tea oil may also be suitably expanded.

4. Problems in Building Fishing Industry Production Bases

A. Summary of Developments

The Boyang Lake area has superior natural conditions and abundant aquatic products; it is the province's main fishing industry production area with a long history in both breeding and natural catches. Nevertheless, under reactionary Kuomintang rule and the exploitation of level upon level of feudal fishery despots in old China, fishing industry production was at the last gasp. After liberation, simultaneous with active development of breeding and major efforts to effect a socialist transformation of jointly owned family fishing boats, settled living on shore, development of economic diversification, the renovation and addition of new fishing boats, the spread of many kinds of equipment on a single boat, individuals with many skills, and individual pieces of fishing gear formed into a whole, fishing industry output developed very greatly. Comparison of aquatic products output for the 11 lakeshore counties[12] in 1979 with 1949 shows a 237,000-dan growth in gross output. This included a rise in output from breeding from the 3,900 dan of 1949 to the 218,000 dan of 1979, a 55.9-fold spurt. During the past 30 years, output of the 11 lakeshore counties has averaged 471,900 dan annually, which is 43 percent of the average annual output for the whole province. This included an annual output from catches of 380,500 dan, or 69.6

12 The 11 lakeshore counties are: Hukou, Xingzi, Duchang, Yugan, Boyang, Xinjian, Nanchang, Yongxiu, Jinxian, Leping and Wannian.

percent of the annual average amount of catches for the whole province, and 91,400 dan from breeding, or 16.6 percent of the total for the whole province. (See Table 3-7).

Table 3-7. Comparison of Aquatic Products Output of 11 Lakeshore Counties With Gross Output for the Province

Units: 10,000 dan

表3—7 单位：万担

a) 年度	b) 类别 / c) 数量 / d) 项目	e) 全省总产量	f) 其中滨湖十一县 g) 产量	h) 占全省%
1949	i) 捕捞	27.60	27.14	98.3
	j) 养殖	20.00	0.39	1.6
	k) 合计	47.60	27.53	57.8
1952	i) 捕捞	56.01	36.15	64.5
	j) 养殖	26.71	0.71	1.4
	k) 合计	82.72	36.86	49.1
1957	i) 捕捞	69.76	44.47	63.4
	j) 养殖	48.06	3.29	6.8
	k) 合计	117.82	47.76	40.5
1965	i) 捕捞	73.70	43.25	58.6
	j) 养殖	62.10	12.65	20.3
	k) 合计	135.80	55.90	41.1
1970	i) 捕捞	62.13	26.10	42.0
	j) 养殖	86.35	13.94	16.0
	k) 合计	148.48	40.04	26.9
1978	i) 捕捞	33.90	22.29	66.6
	j) 养殖	84.60	20.89	24.6
	k) 合计	118.50	43.18	36.4
30年平均	i) 捕捞	54.94	38.05	69.6
	j) 养殖	54.85	9.14	16.6
	k) 合计	109.79	47.19	43.0

1) 资料来源：江西省畜牧水产厅

[Key for Table 3-7 from previous page]

Key: a) Year
b) Category
c) Amount
d) Particulars
e) Gross output for whole province
f) Including 11 lakeshore counties
g) Output
h) Percent of provincial total
i) Catches
j) Breeding
k) Total
l) 30-year average

In addition to fishing industry production, lakeshore growing of river clam pearls, crustaceans, waterfowl, lotus, water chestnuts and lake grasses has also developed well. In recent years, the growing of pearls in river clams has developed particularly fast. The clam shells are processed into buttons, and pearls are used as a valuable medicinal ingredient. Fairly large numbers of waterfowl have been raised in Yugan and Boyang counties. During the 1960's, the state purchased several tens of thousands of waterfowl, many of which were provided for the export trade. In recent years output has declined greatly, and outputs of plentiful lake grasses and famed lotus and water chestnuts have also declined.

B. Measures Pointing the Direction for Protection of Aquatic Product Resources and For Vigorous Revival and Development of the Fishing Industry

Analysis of survey data shows a trend toward deterioration of types of fish in Boyang Lake in recent years. A look at the composition of groups of fish that have been caught shows a decline in large economic fish in the lake and an increase in small economic fish. A look at the composition of major economic fish shows common carp [Cyprinus carpis] and crucian carp [Carassius carassius] to have accounted for about 50 percent of the lake's former gross output. Today they account for between 40 and 45 percent (See Table 3-8). Semimigratory snail carp [Mylopharyngodon piceus], grass carp [Clenopharyngodon idellus], silver carp [Hypophthalmichthys molitrix], bighead carp [Aristlichtys nobilis], and minnow fish [Elopichthys bambusa], as well as one of the miscellaneous kinds of eating fish, Xenocypris davidi, have also declined. The Hukou County Aquatic Products Company has reported that up until 1965, 70 percent of all large fish purchased by the state were silver carp and bighead carp, 30 percent of which weight between 2 and 5 jin each. Since 1966, however, only between 30 and 40 percent of the number of large fish purchased have been silver carp and bighead carp, and only 10 percent of these weight between 2 and 5 jin each.

Table 3-8. Comparison of Percentages of Several Kinds of Economic Fish in Boyang Lake

表3—8　　鄱阳湖几种经济鱼类成鱼组成比较

	1959	1973—1974
a) 鲤、鲫鱼	40—50%	40—45%
b) 青、草、鲢、鳙	10—15%	5—10%
c) 鳡　鱼	3—5%	2—3%
d) 黄尾密鲴	10—12%	5—8%
e) 鲌鱼类	3—5%	3—5%
f) 鳊鱼类	5%	4—5%
g) 鲶　鱼	5%	4—5%
h) 鲚属鱼类	2—3%	10—15%
i) 黄鳈、鳘条等	5—10%	10—15%

j) 资料来源：《鄱阳湖水产资源调查报告》，1974年

Key:
- a) Common carp and crucian carp
- b) Snail carp, grass carp, silver carp, and bighead carp
- c) Minnow fish
- d) Xenocypris davidi
- e) Giant salamander [Cryptobranchus japonicus]
- f) Bream
- g) Sheatfish
- h) Coilia
- i) Pseudobagrus and Hemiculter leucisculus
- j) Source of data: "Survey Report on Boyang Lake Aquatic Products Resources," 1974

A look at changes in the age of fish schools (See Table 3-9) shows that up until 1963 considerable numbers of the common carp caught in Boyang Lake were 7 or 8 years old and weighed between 10 and 20 jin each. After 1964, the number of old carp declined yearly. Though an overwhelming number of the fish were 2 and 3 years old in 1973 and 1974, as compared with 1963 the total number of 2- and 3-year-olds had fallen 11.1 percent, and the total number of 4- and 5-year-olds had dropped 4.6 percent. Common carp more than 7 years old were rarely found, while the number of small carp less than 1 year old had increased.

Table 3-9. Changes in Age Composition of Common Carp in Boyang Lake (%)

表 3—9 鄱阳湖鲤鱼年龄组成变化（%）

a) 年份 \ b) 鱼龄	当年 c)	一冬龄 d)	二冬龄 e)	三冬龄 f)	四冬龄 g)	五冬龄 h)	六冬龄 i)	七冬龄 j)	八冬龄 k)
1963	—	—	66.6	20.1	8.3	3.4	1.2	0.2	0.2
1973 1974	1.1	14.6	59.7	15.9	5.7	1.4	1.6	—	—

1) 资料来源：《鄱阳湖水产资源调查报告》1974年

Key:
- a) Year
- b) Fish age
- c) Current year
- d) 1 year old
- e) 2 years old
- f) 3 years old
- g) 4 years old
- h) 5 years old
- i) 6 years old
- j) 7 years old
- k) 8 years old
- 1) Source of data: "Survey Report of Boyang Lake Aquatic Product Resources," 1974

A look at changes during recent years in natural catches shows a wavelike trend toward decline. At the time of liberation in 1949, catches amounted to 270,000 dan. During the 1950's, catches averaged somewhat more than 400,000 dan; during the 1960's, they averaged somewhat more than 440,000 dan, and during the 1970's (1970-1977), they declined to somewhat more than 320,000 dan. Ever since 1967, catches have been less than 350,000 dan. Output of valuable fish such as hilsa heering and whitebait, which are renowed inside and outside the province, has declined drastically.

2. Energetic Development of Artificial Breeding and Building of Consistently High-Yield Marketable Fish Bases

Full use of water surfaces and development of inland lakes, ponds and pools for the breeding of fish is an imperative trend in development of the region's fishing industry production. In this region, reservoirs, lakes, ponds and pools dot the landscape like stars in the sky, and the breeding potential is very great. According to 1977 statistics, the 11 lakeshore counties had more than 1 million mu of water surfaces, but only approximately 50 percent of usable water surfaces are in use today. Large amounts of water surfaces are still available for breeding. If this region is to be built into an important aquatic products base for the whole country, emphasis will have to be placed on the breeding industry.

(1) Full use of water surfaces, and vigorous development of diked lakes for the rearing of fish, with emphasis on the building of a series of marketable fish bases. As Boyang lakeshore land reclamation endeavors develop, the dikes lake water surface area steadily increases, providing extremely favorable conditions for development of breeding in diked portions of the lake. A policy of "taking breeding as the key link while combining rearing and catches" must be further instituted to make full use of diked lake water surfaces and to develop vigorously the rearing of aquatic products, as well as suiting general methods to local circumstances for development of economic diversification to tap the potential of bodies of water to the full.

On the south side of Boyang Lake, Jinxian County, which is surrounded by water on three sides, has water surfaces accounting for one-third the county's total land area, an overwhelming majority of which is diked lake. In 1976, the building of seven collective aquatic products farms was begun around the lake for the stocking of the lake with fry, and 854 mu of fish fry ponds were dug. For 2 consecutive years, 3 million high-standard fish fry were released into Junshan Lake,[13] and in 1977, lake output of fish increased by 300,000 jin over 1975, which was before the release of fry, for a gross output of 5.2 million jin. Lianhu Commune in Boyang County energetically developed breeding in diked lakes, scoring heartening successes. Since 1972, seven barren lakes and inlets have been transformed, and 24,000 mu of inland lake surfaces are being used for the rearing of fish. During the past 6 years, output of fresh fish has been 1.7 million jin, and 1.2 million jin of marketable fish has been turned over to the state for maintenance of the commodity rate at more than 86 percent. In 1977, the commune began to provide 470,000 jin of fresh fish, each person making a 10,000-jin contribution (figured on the basis of the average number of staff members and workers at the aquatic products farm), and has accumulated 150,000 yuan in funds for the commune to advance development of agricultural production.

It should be pointed out that this region has many inland lakes that are not yet being used, and that yields from those that are being used are very low. In Jinxian County, for example, yields are only 13.5 jin per mu, and in 1977 fresh fish yields from the Lianhu Aquatic Products Farm in Boyang County were also only 20 jin per mu. Consequently, increasing yields per unit of area is an extremely important task. In proceeding from current conditions, it is extremely important that those inland lakes that have a fairly good existing basis, a fairly good potential, and fairly high commodity rates should be selected for state

13 Junshan Lake was once a part of Boyang Lake, but in 1958 a dam was built that blocked the connection and it became an inland lake in Jinxian County with a water surface of 360,000 mu, which is one-eighth the total area of the whole province, and 65 percent of its usable water surface. The area around the lake is flat; water quality is excellent; fish food is plentiful; only a single opening connects it with another lake (there is no sluice gate), and natural conditions are good.

investment to build marketable fish bases. Junshan Lake in Jinxian County and Xiang Lake in Nanchang City are in the process of being rapidly built into major provincial bases for marketable fish. In addition, Taibo Lake and Fang Lake in Pengze County, Xinmiao Lake in Duchang County, Nanbei inlet in Hukou County, Chi Lake in Ruichang and Jiujiang counties, Bali Lake in Jiujiang City, and Lian Lake in Boyang County are all slated for step-by-step building into major provincial marketable fish bases. Much investment of manpower, material, and financial resources must be made, and good performance in building a completely equipped project must be emphasized.[14]

(2) Vigorous development of the rearing of fish in ponds and pools, and increase in yields per unit of area. Development of the rearing of fish in ponds and pools plays an important part in assuring supplies to cities and the countryside, in satisfying the needs of people's daily lives, and in increasing earnings. In 1977, this region had 220,000 mu of ponds and pools, or 39 percent of the provincial total. Yields per mu were not high however, averaging only 78 jin per mu. This was a far cry from the yields of advanced areas inside and outside the province. Action must be taken as quickly as possible to increase the rearing of fish in inland streams, ponds and pools in order to satisfy the people's needs.

5. Problems in Building Suburban Vegetable Bases

A. Development of Vegetable Production and Perennial Vegetable Field Patterns

Vegetables are an important nonstaple food indispensable in people's lives. Since large supplies of vegetables must be produced and supplied, and since they are fresh and tender and easily rot, do not tolerate storage, and cannot be readily hauled long distances, it is extremely necessary to build nearby vegetables bases in suburban areas that are commensurate in size to the urban population in order to satisfy people's needs in cities and in industrial and mining areas.

This region is an agricultural region in the province that is fairly economically advanced, that has fairly dense cities and towns, and in which there is a fairly large concentration of nonagricultural population. According to 1978 statistics, the whole region's non-agricultural population was more than 2.18 million, which was 18 percent of the total population of the whole region, and 45 percent of the non-agricultural population in the province. Nanchang City is the political, economic and cultural center of the province. Jiujiang and Fuzhou cities are also important cities in the province. Lu Shan is a scenic tourist area renowed in China and abroad. In addition there are the county

14 Including fully equipping the project with water conservancy facilities, fully equipping the project to link the fishing industry and animal husbandry (to solve the fish food problem), and fully equipping the project with a fish fry base.

seats of Boyang, Leping, Fengcheng, Xinyu, Gao'an and Qingjiang counties, each with a population of more than 50,000. Development of industry, mines, cities and towns has given impetus to corresponding development of suburban vegetable production.

This region's suburbs have a long history of vegetable production, and it has many superior varieties. Examples include red chili peppers from Leping County, onions from Jiujiang, Duchang garlic, winter melon from Nanchang and Boyang counties, Gao'an taro, and fresh ginger from Dongxiang and Linchuan counties. Not only does the region supply its own needs, but also ships large quantities outside the province. Since liberation, suburbs have expanded the vegetable-growing area in accordance with population. They have raised yields per unit of area, and have increased varieties of vegetables. Year-round vegetable bases have been developed around some new industrial and mining cities and towns, and the pattern of vegetable production has become increasingly rational. Take Nanchang City, for example. Comparison of 1978 with 1965 shows a 52 percent increase in year-round suburban vegetable fields. Average yields per mu and quantities marketed have increased 15.8 and 114.7 percent, respectively. Average per capita supply of fresh vegetables to the whole city has increased from 0.57 jin to 0.84 jin, and substantially satisfy needs of people in the city, in industries and in mines. Production conditions in vegetable-growing areas have also improved considerably, particularly spray irrigation. Since smashing of the "gang of four," spray irrigation has developed from nothing and spread from individual sites to whole areas in smooth development. Regional distribution of vegetable production, particularly distribution of year-round vegetable fields has undergone marked change. Main features are as follows: As a result of the development of cities, industries, mines communications and transportation, land in the suburbs (particularly close-in suburbs) has been taken over and vegetable bases have been forced outward. In close-in suburbs, year-round vegetable fields account for a substantial proportion of the cultivated land, and the seasonal vegetable field area of communes and brigades some distance away from cities has correspondingly increased substantially. Grainfields still hold the leading position in areas that sandwich the growing of vegetables with the growing of grain. Population is large relative to land in the suburbs; field care is rather intensive, and vegetable yields per unit of area are fairly high. In distant suburbs where a mixture of grain and vegetable crops are grown, however, care is fairly nonintensive, and yields per mu are low. The amount of cultivated land is greater, however, which is an advantage for crop rotation on seasonal vegetable fields and for the growing of varieties of vegetables that take a fairly long time. New industrial areas and some large industrial and mining enterprises have correspondingly established nearby their own year-ground vegetable-growing bases. This pattern corresponds to the development and the pattern of cities and towns, industries, and mines.

B. Measures Pertaining to the Direction of Further Development of Vegetable Production

Current problems in the region's vegetable production include monotonous varieties, not very high yields per mu, rather poor quality, unevenness in market supply, and imbalances during slack and busy seasons. Greater development of the region's suburban vegetable production requires the following actions:

1. Good performance in year-round vegetable base farmland capital construction for consistently high yielms. Natural conditions are comparatively superior in the suburbs of all the cities and towns in this region, and favor the growing of all sorts of vegetables. However, when fairly large floods occur, the threat of flooding and waterlogging disasters is great, and during summer and fall, drought disasters occur sometimes. All-round planning; suiting of general methods to specific circumstances, and vigorous development of farmland capital construction centering around soil improvement and harnessing of water for gradual garden-style farming; genuine solution to vegetable field problems of withstanding floods, draining waterlogging, and irrigation, to insure that floods outside the dikes do not topple the dikes, that torrential rains do not cause waterlogging inside the dikes, that long periods of rainfall do not damage the vegetables, and that long period of sunny days do not cause drought; a firm grip on the "five changes"[15] for vegetable fields and fundamental change in vegetable production conditions are keys to winning consistently high vegetable yields and solving contradictions between slack and busy seasons. Building of vegetable bases requires suiting general methods to specific circumstances to plan on the basis of natural conditions, such as climate, topography, and soil, as well as the existing historical foundation, size of urban and town populations, industrial distribution, communications and transportation, and consumption habits. One universally existing problem is a lack of comprehensive scientific planning of cities. The taking over of land for industrial production is still not done with the common good in mind. This has resulted in very great instability for vegetable bases in some cities and towns. Quite a few consistently high-yielding year-round vegetable fields have been taken over. This has amounted to one sector taking over the land of another, and it has caused no end of

15 "Five changes" means change of long vegetable beds into short vegetable beds; change of wide vegetable beds into narrow vegetable beds, change of low vegetable beds into high vegetable beds, change of flat vegetable beds into upraised vegetable beds; change of shallow ditches, making small ditches connect with large ditches and large ditches connect with rivers so that when the rains stop and the land dries, both irrigation and drainage can be done. The "five changes" for vegetable beds will also help increase the vegetable land-utilization rate, expand the vegetable-growing area, help field care, and help bring about modernization (of drainage and irrigation, transportation, and farming).

problems in farmland capital construction. In suburban Nanchang, for example, 1,606 mu of vegetable fields were taken over between 1972 and April 1977, most of them year-round vegetable fields concentrated in the close-in suburbs. Other examples were Yonghe and Changxiang production brigades in Tangshan Commune, Jinshun, Shunwai and Jinwai production brigades and an aquatic products farm in Hufang Commune, Sandian Production Brigade in Qingyunpu Commune, and Yicun Production Brigade in Taohua Commune. In the foregoing communes and brigades, vegetable fields per capita of work force declined from 0.5-0.6 mu to 0.2 mu in 1977. As a result, land became scant relative to the work force, heavy pollution ensued and production became inconsistent. It is recommended that when future overall regional and city planning is done, simultaneous consideration be definitely given to suburban vegetable base plans.

2. Solution to contradictions between slack and peak seasons to achieve year-round balanced supply; increase in varieties and improvement in vegetable quality. The climate makes for an extreme shortage of vegetables during the slack season, but when the peak season comes, amounts reaching markets increase greatly, and there is too much in some years. As a result, large quantities rot or are resold to rural villages for use as fertilizer. This wastes manpower and transportation costs, and entails serious losses for the country. It is necessary to summarize conscientiously the experiences of suburban vegetable farms with rational planning of crop succession, matching of varieties, improvement of planting techniques, production of high yields, and putting an end to the slack season, and a good job must be done in promotional work. At the same time, planning by distant suburbs of their seasonal vegetable fields is extremely necessary to make up for shortages in supply during the slack season. In planning kinds of vegetables, more spring cabbage, onions and potatoes should be grown during winter. Fruit orchards may be intercropped with one crop of green vegetables. During March, a crop of young Chinese white cabbage or spinach may be added. Water surfaces may also be used to grow aquatic vegetables such as celery. During fall, a late crop of winter melons, chilli peppers, towel gourds, fall eggplant, fall zucchini and early radishes may be produced as feasible. Wetland vegetable fields may also be used to grow arrowhead, coba and lotus root. The commercial sector should prepare the way for building of vegetable-processing plants for processing of peak season vegetables so as to even out shortages during the slack season.

The region's suburbs currently produce between 70 and 80 kinds of vegetables, far fewer than some large and medium cities in the country. During the past few years, in particular, the proportion of fine vegetables has fallen and the numbers of kinds has decreased in some places. In some places, special kinds have even been squeezed out entirely. Leping County chilli pepper is one example, the production of which reached an all-time high of between 3 and 4 million jin (1963, 1964). Output has declined in recent years to less than 1 million jin in 1977. During the early 1970's Duchang County grew more than 2 million jin of garlic, but output declined to somewhat more than 600,000 jin in 1978. There have been two main reasons as follows: First is inequitable differences

in prices for varieties. Several years ago, some places ill-advisedly raised prices for crude vegetables, with the result that the area planted to fine vegetables declined greatly. Second is competition between grain and vegetables for land. Some counties and communes lopsidedly emphasize grain production without regard for the needs of people's daily lives. They arbitrarily restrict the growing of land for marketable seasonal vegetables, thereby reducing much of the traditional vegetable-growing area, with resulting output declines. All rural economic policies must be carried out diligently and resolute action taken to increase the proportion of fine vegetables so that half crude and half fine vegetables will be grown within the next several years. At the same time, vigorous efforts should be made to revive and expand the growing of the special traditional varieties so much loved by the people of this region, particularly the growing of the "four hots" (chilli pepper, fresh ginger, garlic and onions) to satisfy the constantly increasing needs of people in cities and the countryside.

3. Increase in sources of fertilizer to insure increased vegetable production. Vegetables are replanted numerous times, requiring a large amount of fertilizer. The large amounts of garbage and human feces and urine produced daily by the suburbs are a principle source of fertilizer for vegetable field production. However, in all of the suburbs in this region, the level of development of the livestock industry, in which the raising of hogs is dominant, is not very high, and this hurts efforts to raise vegetable yields per unit of area. The more hogs, the more fertilizer, the more vegetables. Full use of advantagous conditions in the suburbs such as slops, melon and fruit rinds, and vegetable skins for vigorous development of hog raising and poultry production would not only increase the supply of meat and poultry eggs in markets as well as the earnings of commune members, but would also be a key measure for increasing the supply of organic fertilizer. Sanlian Production Brigade in Yangzizhou Commune in suburban Nanchang took in hand both the growing of vegetables and the raising of hogs. This brigade with 1,190 mu of cultivated land (including 1,070 mu of year-round vegetable beds and 120 mu of seasonal vegetable land) produced 2,650 hogs (1,000 of them by the collective) in 1977, for an average of 2.4 head per mu, 1 head per capita, and 2.5 head per household for overfulfillment of standards set by the "National Program for Agricultural Development." Development of hog raising greatly increased vegetable yields per unit of area. In 1977, vegetable yields averaged 15,000 jin per mu, 52 percent higher than yields per mu for year-round vegetable beds for the suburban area as a whole.

4. Launching of mass scientific experimentation to achieve high vegetable yields. Scientific vegetable growing is the way to go in order to vanquish the slack season, even out marketing, and realize consistently high yields. During the past several years, a four-tier science and technology vegetable network has been in process of being built and perfected by the counties, communes, brigades and production teams in Nanchang and Jiujiang prefectures. Vegetable hybrid heteroses have been used to begin experiments. Numerous communes and brigades have

actively test planted new varieties, improved farming techniques, achieved high yields, overcame the slack season, and acquired numerous experiences. Overall, however, this region's level of vegetable research remains fairly low, and actions taken have not been vigorous enough. Scientific research on vegetables must be supported with manpower, material and financial resources. Right now emphasis should be placed on use of hybrid heteroses, efforts devoted to the propagation of varieties that resist calamities (freezes, watterlogging, drought, diseases, and insect pests, increase in slack-season varieties and high-yield superior varieties, plus experimentation with farming techniques, scientific fertilization, scientific watering (such as spray irrigation), and prevention and control of diseases and insect pests, in order to provide experience in increasing yields per mu over large areas, increase varieties, in overcoming the slack season, and in balancing market supply.

In addition, suburbs having requisite conditions should select permanent year-round vegetable bases, build hothouses, grow summer vegetables in winter, and gradually expand production. Lu Shan is a scenic summer resort area renowned in China and abroad. During summer and fall each year, many Chinese and foreign tourists visit the mountain to view the scenery and to convalesce, so good performance in nonstaple food production, such as vegetables, is extremely important on the mountain. However, because of the limitations of weather conditions, almost all the vegetables currently needed are brought in from Jiujiang and elsewhere, and supplies are extremely short. Now only do costs rise, but quality falls. As tourism develops, the amounts of vegetables needed in the future are bound to increase, and the kinds and quality of vegetables needed will become higher as well. Thus, it is imperative that priority be given to supplying funds and materials to the Lu Shan region for building of a number of hothouses.

Chapter 4. The Western Jiangxi Hill and Mountainland Grain, Forest, Oil-bearing Crop, and Tea Farming and Forestry Region

This region is located in western Jiangxi where the terrain is part of the mountainlands and hills on the border between Hunan and Jiangxi. It includes Wuning, Xiushui, Tonggu, Jing'an, Fengxin, Yifeng, Shanggao, Wanzai and Yichun counties, Yichun City, Fenyi County, Pingxiang City, Yongxing, Lianhua and Ninggang counties, as well as the Jinggangshan Administrative Bureau, for a total of 16 administrative units. The land area totals 28,700 sq km (43,077,000 mu), which is 17.3 percent of the area of the whole province. It has a population of 5,087,000, including an agricultural population of 4,403,000, and an agricultural work force of 1,503,000. It has 5.51 million mu of cultivated land, which is i4.5 percent of the cultivated land area in the whole province. This includes 4.47 million mu of wetlands, an average of 3.67 mu of cultivated land per capita of workforce.

Throughout the mountainlands, mountain peaks rise and fall, and hills are widely found. Forest resources are fairly plentiful, and the tea oil forest area is very large. This is one of the province's main timber, bamboo and woody oil-bearing tree bases. Grain production also holds an important position. This region is even more renowned for Wanzai grass linen, and "Ninghong" tea from Xiushui and Tonggu counties. In addition, diverse forestry sideline products, medicinal herbs and silkworm mulberry hold fairly important positions in the province. It is an agricultural region in which conditions for agricultural production are rather superior, the mountain forest area extensive, and specialized products diverse.

First Section. Agricultural Production Conditions

1. Primarily Hills and Mountainlands, Mountains and Valleys Paralleling and Alternating With Each Other

The topography of this region is primarily hills and mountainlands. Its plain is rather narrow. The mountainland area above 500 m accounts for approximately 48 percent, and the high hill region between 300 and 500 m accounts for approximately 18 percent of the total area. It is one of the agricultural regions in the province with a fairly high proportion of mountainlands and hills. (See Table 4-1).

A. The area that lends itself to development of forestry is fairly extensive, while the area suitable for farming is relatively small. Statistics show approximately 30.89 million mu of the whole region as being used for forestry.[1] This represents 71 percent of the total area of the whole region. The nonforestry land area is 12.35 million mu or 28 percent of the total land area, including a cultivated area that is only 12.8 percent of the total. Land used for forestry is found mostly

1 According to a general survey by the Jiangxi Designing Institute in 1976.

in mountainlands and hill regions. Mountainlands with a relative elevation of more than 500 m have low temperatures and are wet year-round. The soil contains plentiful organic matter, suiting it to the growing of forest trees such as fir, pine and bamboo. Farmland consists of some sunken fields and mountain flatland fields that are small in area and scattered. Largr tracts of tea oil forests are found on hills; however, water conservancy problems have not yet been fully solved, nor is water used to the full for agriculture. Although farming is concentrated in river valley plains areas, the area is still fairly small. Consequently, this point must be fully realized in the future and the most made of the advantages of the many mountains to place forestry production in a more important position. In addition, there are many grassy slopes on mountains and hills that may be used primarily for vigorous development of grass-eating livestock.

B. There is a pattern to the distribution of diverse landforms that provides fairly advantageous conditions for development of grain production and economic diversification. With the exception of the Jinggangshan Administrative Bureau and Ninggang, which have no plains, plus a very small plains area in Jing'an County, an overwhelming majority of the 16 counties and cities have a definite percentage of river valley plains, plus hills and mountainlands. This is very advantageous for development of grain production and for economic diversification. Today, in formulating agricultural development plans, many counties propose "development of fir timber forests in distant and remote mountains, development of tea oil, and fruit tree economic forests in low mountains and nearby mountains, development of tea and dryland crops on downlands, and development of paddy rice on plains." This is concrete planning to use the special characteristics of all kinds of agricultural landforms to develop economic diversification and a rational pattern of agricultural production.

C. The northeast by southwest orientation of mountain ranges acts as a protective screen against cold air from the north. The screening effect of the mountain ranges frequently has a very great bearing on the direction of flow of cold air currents. Cold air follows three main routes in this region as follows: The first is the western route. Cold air that comes from this direction virtually parallels the lay of the mountain ranges, and thus the ranges are unable to play a screening role. Conversely, the parallel ranges and valleys play a channeling role, with the result that in western Pingxiang, Yichun and Fenyi counties, the river valley plains areas have big westward winds for a short period of time. However, since this cold air route is a long one and the time for degeneration is also long, their force is fairly weak, and their effect not very severe. The second route that cold air travels is virtually perpendicular to the orientation of the region's mountain ranges, and thus their screening effect is marked. This cold air is generated northward and is strong, moves rapidly, and has little degeneration. Frequently, it causes disastrous weather with low temperatures and high winds. Since this region has mountains to block this cold air, windspeeds are lower than on the Boyang Lake Plain, and low temperatures are not extremely serious.

The third route is the eastern route. Though cold air can cause low temperatures and overcast, rainy weather, still, there are no high winds such as the northwestward ones on the eastern plain, and their force is also fairly weak.

Table 4-1. Statistical Table on Categories of Landforms in Each County of the Western Jiangxi Agricultural Region

a) 县、市	土地面积 b) (平方公里)	山 c) 地		丘 d) 陵				平 e) 原 (包括水面和部分岗地)	
		面积 f)	占土地面积% g)	高丘 a) 面积	占土地面积% g)	低丘 a) 面积	占土地面积% g)	面积 f)	占土地面积% g)
h) 全区合计	28718.0	13794.0	48.0	5134.7	17.9	7893.7	27.5	1896.0	6.6
i) 北部副区	14514.0	8604.0	59.3	2135.3	14.7	2568.1	17.7	1207.0	8.3
j) 武宁	3504.0	1717.0	49.0	536.8	15.3	935.2	26.7	315.0	9.0
k) 修水	4503.0	2927.0	65.0	924.9	20.5	606.1	13.5	45.0	1.0
l) 铜鼓	1547.0	1346.0	87.0	201.4	13.0	/	/	/	/
m) 靖安	1378.0	1089.0	79.0	172.7	12.5	75.3	5.5	41.0	3.0
n) 奉新	1642.0	788.0	48.0	162.2	9.9	215.8	13.1	476.0	29.0
o) 宜丰	1940.0	737.0	38.0	137.3	7.1	735.7	37.9	330.0	17.0
p) 中部副区	9690.0	2645.0	27.3	2078.1	21.4	4277.9	44.1	689.0	7.1
q) 上高	1349.0	67.0	5.0	168.6	12.5	640.4	47.5	473.0	35.1
r) 万载	1710.0	752.0	44.0	127.8	7.5	693.2	40.5	137.0	8.0
s) 宜春	2522.0	681.0	27.0	734.4	29.1	1081.6	42.9	25.0	1.0
t) 分宜	1338.0	147.0	11.0	398.7	29.8	738.3	55.2	54.0	4.0
u) 萍乡	2771.0	998.0	36.0	648.6	23.4	1124.4	40.6	/	/
v) 南部副区	4514.0	2545.0	56.4	921.3	20.4	1047.7	23.2	/	/
w) 莲花	1062.0	648.0	61.0	188.6	17.8	225.4	21.2	/	/
x) 永新	2216.0	1019.0	46.0	496.0	22.4	701.0	31.6	/	/
y) 宁冈 井冈山	1236.0	878.0	71.0	236.7	19.2	121.3	9.8	/	/

z) 注：① 宜春包括宜春市和宜春县

② 较窄小的河谷平原都未量算，实际绝大部分县都有相当面积的平原存在。以下各区类同。

[Key for Table 4-1 from previous page]

Key: a) County or City
- b) Land area (sq km)
- c) Mountainlands
- d) Hills
- e) Plains (including water surfaces and some downlands)
- f) Area
- g) Percentage of land area
- h) Total for whole region
- i) Northern subregion
- j) Wuning
- k) Xiushui
- l) Tonggu
- m) Jing'an
- n) Fengxin
- o) Yifeng
- p) Central subregion
- q) Shanggao
- r) Wanzai
- s) Yichun
- t) Fenyi
- u) Pingxiang
- v) Southern subregion
- w) Lianhua
- x) Yongxin
- y) Ninggang, Jinggangshan
- z) Note: 1) Yichun includes Yichun City and Yichun County.
  2) Fairly narrow river valleys not figured in. Actually, an overwhelming majority of counties have a substantial plains area. The same applies to regions discussed hereinafter.
- aa) High hill area
- ab) Low hill area

The screening effect of the mountain ranges has very great significance for agricultural production. By selecting advantageous terrain conditions on south slopes for the growing of overwintering crops and economic fruit trees, it is possible to avoid the freeze damage caused by especially powerful cold currents.

D. Acceleration of ground runoff readily causes disastrous torrents. In rivers and basins that have developed where mountain ranges and valleys parallel each other, the terrain is high on each side and low in the middle, and concentrated tributaries converge from both sides toward the center. Slopes are steep, and ground runoff moves extraordinarily fast. In addition, torrential rains are fairly concentrated and the lay of mainstreams flowing from east to west generally parallels that of weather fronts, with the result that the entire basin receives rain at the same time and streams rise very quickly. In addition, this is a region of mostly upper and middle reaches of streams, so the paths

of torrents are steep and narrow, making the waters violent in force. Thus, disastrous torrents are apt to occur on river valley plains. For example, the Fangxi and Yifeng, two tributaries of the Jin River in Yifeng county, concentrate rainfall from a 1,250 sq km area. These streams flow a short distances down a steep slope, and floodwaters may rise within 6 hours. Should torrential rains measuring 300 to 500 mm fall for 3 consecutive days, the volume of flow may reach 2,600 m^3 per second. The Shanggao section of the river can handle only 1,400 m^3 per second, however, and it is unable to contain the floodwaters of the second tributary. It would be even less able to drain away a torrential flow of 4,080 m^3 per second such as might be encountered once every 30 years, and river flats would meet with disaster. Thus, 50,000 mu of farmland in this area is frequently threatened by flood disasters. Another example is in Xiushui County where the terrain is bowl shaped. Here streams originate in the high mountains all around and converge in the river valleys toward the center in a swift concentrated flow. Furthermore, erosion is fairly serious in river basins; river beds have become silted high, and the transverse section of channels for floodwaters has become shortened, making flood disasters even more serious. Given the characteristics of these river systems, a program should be adopted that makes use of animal power for the most part to build reservoir and pond dams in mountain region upper reaches to impound floodwaters. This would not only eliminate disastrous floods, but would also allow full use of plentiful water conservancy resources.

This region may be roughly divided into five agricultural terrain types on the basis of a combination of various kinds of terrain features and soil vegetation cover as follows:

The first is the central mountain type. This type has an absolute elevation of over 1,000 m and a relative elevation of 500 m. Mountain masses are high and large; slopes are fairly steep; the weather is cold and wet; soil vegetation cover varies markedly with elevation; the forest preserve area is relatively large; the soil is fertile, and most of the land is used for forestry, farmland consisting of only an extremely small number of sinkhole fields. It lends itself to future development of timber forests.

The second is the low mountain type with an absolute elevation ranging from 500 to 1,000 m, and a relative elevation of from 200 to 500 m. Plant cover today consists mostly of pine, fir and bamboo, which grow in profusion. There are also some tea oil forests. Since development of this type is fairly convenient, it is the region's principal forestry base. Farmlands are found mostly in mountain basins and in alluvial valleys, and consist mostly of cold, pasty, low-yield fields. Mostly a single crop of paddy is grown there today. Since water is plentiful and the soil's latent fertility is high, potential for increased yields is fairly large. In future, this type will lend itself mostly to development of forestry and animal husbandry, and emphasis must be placed on increased farmland yields per mu.

The third is the high hill type at an elevation above sea level of from 300 to 500 m, and a relative elevation of 200 to 300 m. Plant cover currently consists mostly of masson pines, firs ans scrub growth, but there are also large tracts of tea oil forests and grassy slopes. Fields are mostly alluvial ridged fields with some sinkhole fields, including blue mud fields and black sandy clay fields. The soil is fairly fertile. Since this type is at a relatively low elevation and temperatures are relatively high, and since it is near mountainlands as well, the graben area for concentrating water is large and conditions exist for the building of reservoirs and mountain pools. Water is plentiful, so this is the region's main farming area. Pingxiang and Yichun counties have become high-yield paddy rice areas. At the same time fine conditions eixst here for development of economic forest trees and timber forests; thus this type is suited for future all-round development of farming, forestry, animal husbandry and sideline occupations.

The low hills and downlands in which quarternary red sandstone predominates. This type is at an elevation of from 50 to 200 m, and slopes run from 15 to 20 degrees. Though there are numerous kinds of landforms, common characteristics are the rolling terrain, no great differences in relative elevation, a cutup land surface intersected by downlands and flatlands, a small water-concentration area, insufficient supplies of water, considerable threat of drought, and much scrub growth and grasslands. Most of the farmland is made up of riverbank fields and ridged fields on which mostly dryland crops are grown. Though there are large areas of tea oil forests, they do not grow well. Once water conservancy problems are solved in the future, yields per unit of area can be increased, the cultivated area expanded in a planned way, and vigorous afforestation with tea oil forests and other economic forests done.

The fifth is the river valley plain type. This type is found on both banks of rivers and includes river flats and terraces. The land is mostly flat with small areas that are not flat, elevation differing by between 5 and 10 m. Farmland types are mostly flatland fields and some ridged fields. Since rivers frequently carry fine particles a fairly long distance away during periods of flooding, fairly coarse material has been deposited near river banks. Thus, flatland field soil has a rather definite pattern, namely, that extending outward from both riverbanks one finds stony fields, coarse gravel fields, gravel fields, intercalated sandy fields and clay fields. On tertiary red soil terraces, yellow clay fields have developed. Near villages, cities and towns, where cultivation is done intensively, one finds black sandy fields. Farming is intensive here and the soil utilization rate is very high. Possibilities exist for some expansion of the cultivated land area here once the rivers have been dredged and water conservancy conditions have been further improved.

2. Copious Water and Heat Resources and a Fairly Complex Climate

This region extends south to north covering 3.5 degrees of latitude. The land is rolling with a maximum elevationof 1,700-odd m. The weather varies considerably from place to place. Overall, temperatures are somewhat lower than in other agricultural regions, and moisture conditions are better (See Table 4-2).

Table 4-2. Climatic Statistical Data for Representative Counties in the Western Jiangxi Agricultural Region

Units: °C; millimeters; hours; days

代表县 a)	平均气温 b)			极端气温 c)		≥10℃积温 d)			年平均降水量 e)	日照时数 f)	无霜期 g)
	h) 年温	i) 一月	j) 七月	k) 最高	l) 最低	m) 初日	n) 终日	o) 积温			
p) 武宁	16.4	4.0	28.1	41.1	—13.5	25/3	16/11	5191	1451	1786	240
q) 修水	16.6	4.2	28.2	44.9	—11.6	25/3	16/11	5204	1563	1675	247
r) 靖安	17.1	4.7	28.3	39.9	—10.2	22/3	19/11	5379	1615	1865	271
s) 铜鼓	16.3	4.4	27.2	39.4	—13.4	27/3	14/11	5034	1727	1488	267
t) 宜丰	17.1	4.9	28.4	40.1	—10.5	22/3	19/11	5400	1744	1632	264
u) 宜春	17.2	5.2	28.5	41.6	—9.2	23/3	19/11	5407	1582	1732	272
v) 萍乡	17.3	5.0	28.9	40.1	—8.6	22/3	19/11	5449	1559	1551	279
w) 莲花	17.6	5.8	28.4	39.7	—12.5	21/3	22/11	5534	1569	1705	282
x) 宁冈	17.1	5.5	27.4	40.0	—10.0	23/3	20/11	5322	1472	1582	293

Key:
a) Representative counties
b) Average temperature
c) Extremes of temperature
d) Cumulative temperatures of 10°C or above
e) Average annual precipitation
f) Number of hours of sunshine
g) Frost-free period
h) Average annual temperature
i) January
j) July
k) Maximum
l) Minimum
m) First day
n) Last day
o) Cumulative temperature
p) Wuning

[Key continued from previous page]

q) Xiushui
r) Jing'an
s) Tonggu
t) Yifeng
u) Yichun
v) Pingxiang
w) Lianhua
x) Ninggang

Sunlight conditions: This region receives fairly plentiful sunlight, sunshine ranging from 1,488 to 1,865 hours annually for a 34 to 42 percent sunshine rate. Mountain regions, however, have much fog and clouds with relatively few sunshiny days. The utilization rate for light-energy resources in terms of the region's current agricultural production level runs from 0.5 to 1 percent, and the production potential is very great.

Heat conditions: This region's annual temperature averages from 16.3° to 17.9°C. Temperatures are above 17°C everywhere except for Xiushui, Wuning and Tonggu counties where temperatures get below 17°C. In Tonggu, temperature averages 16.3°C, the lowest in the whole province. The pattern is one of decrease from south to north and from the plains to the mountains. January is the coldest month when the monthly temperature averages 4.0° to 7.0°C. A temperature of 4.0°C in Wuning County is the province's lowest. July is the hottest month when the monthly temperature averages 27.2°-28.9°C.

This region has 233 to 247 days when the average daily temperature is stabilized at 10°C or above. Tonggu County with 233 days has the smallest number of days. Cumulative temperature for days when temperature is stabilized at 10°C or above ranges from 5,034° to 5,534°C, Tonggu County having the lowest at 5,034°C. Cumulative temperatures in this region are lower than in counties at the same latitude in the Gan River basin. Around Pingxiang County, however, cumulative temperature is relatively high and the level of farming is also high. As a result, test planting of "paddy-paddy-wheat" in a three-crop system turned out rather well. Because of their high elevation above sea level, however, temperatures are low in the mountains and hills, making possible the growing of only two or just one crop each year. General methods must be suited to specific circumstances in planning the farming system.

Moisture conditions: This region averages 1,451 to 1,755 mm of precipitation annually, its distribution varying from place to place. The Jiuling mountain region is the center of heavy rainfall, while precipitation tends to be slight around Ninggang. This region averages somewhat more precipitation than the northern Jiangxi agricultural region at the same latitude, but somewhat less than the eastern Jiangxi agricultural region. Year-to-year variations in the amount of precipitation

are fairly great in this region. In years of heavy precipitation, as much as 2,100 to 2,200 mm and more may fall; in years of light precipitation, only approximately 1,000 mm may fall, a difference of 900 to 1,000 mm or more. Though the amount of precipitation varies seasonally, precipitation here is better during summer and autumn than in other agricultural regions. In addition, irrigation from mountain springs means no severe shortage of water for agriculture. This is one of the reasons that the masses say, "bumper crops during small droughts and assured crops during medium droughts."

Though climatic conditions are relatively superior in this region, the region also experiences calamities such as spring cold, floods and waterlogging, midautumn drought, low autumn temperatures, and frost damage.

Spring cold: Spring cold occurs fairly frequently in this region. Summary statistics from the period 1957 to 1978 show fairly severe winter cold as having occurred in 1957, 1961, 1965, 1966, 1970, 1972 and 1976. In several years, more than 20 days of continuously overcast and rainy days with low temperatures caused serious rotting of seedlings. During the last 10 days of March in 1965, for example, spring cold caused Shanggao County a loss of 400,000 jin of paddy seeds, and in Yongxin 30 percent of seedlings rotted. Widespread seedling rot also occurred in all other counties.

In this region, the first day on which the average temperature stabilizes at 10°C occurs between 20 and 27 March, Tonggu being latest in the province on 27 March. Thus, the region must do careful planning of its spring sowing on the basis of weather conditions. High mountain regions having cold water and little sunshine must summarize experiences even more conscientiously in order to grow sturdy seedlings, and they must take effective action to prevent seedling rot.

Flooding and waterlogging: Flooding and waterlogging occurs in most of the region's river valleys, and mountain torrents that demolish houses and innundate farmlands also occur in mountain regions. Statistics show various degrees of flooding and waterlogging to have occurred in this region during 1954, 1955, 1958, 1961, 1962, 1967, 1970, 1973 and 1976. In Fenyi County, for example, 519 mm of rain fell during June 1962, 195.7 mm falling during the single day of 18 June. This caused river waters to rise suddenly and cause a flood disaster that drowned 80,000 mu of farmland.

Midautumn drought: This region's river valleys and plains are prone to both waterlogging and drought, and the midautumn drought poses a particularly large hazard for growth of the second crop in a two-crop system. The masses say, "a drought in July is nothing, but a drought in August reduces the harvest by half." Statistics show drought disasters in this region as having taken place in 1953, 1958, 1963, 1971 and 1978. The drought of 1963, in particular, was such as had not been encountered in several decades. Therefore, this region must bend major efforts to

development of water conservancy projects, and it should consider crop rotation between wetlands and drylands in places where unirrigated fields "depend on the skies," and whre cumulative temperatures are insufficient, thereby making the most of advantages and playing down disadvantages.

Low autumn temperatures: Low autumn temperatures come early in this region, and in some years the daily temperature never rises to 20°C. On average, low autumn temperatures in this region occur between 23 September and 4 October, the date of arrival being earliest in Tonggu County. Low autumn temperatures pose a very great threat to the late crop. In 1965, and 1967, for example, low autumn temperatures in Fengxin County damaged half of the late crop throughout the county.

Freeze damage: Winter freeze damage is fairly severe in this region. Historical records show a major freeze as having occurred in early 1929 that lasted for a whole month. Since liberation, serious freezes have occurred in 1954, 1958, 1964, 1969, 1971, 1972 and 1976. During the most serious one of February 1964, it snowed for 9 days, the snow reaching a maximum depth of 13 cm, and the single greatest drop in temperature was 18° to 22°C and more.

3. Socioeconomic Conditions

A. Human and animal power is fairly abundant. In this region, each member of the work force serves 3.67 mu of cultivated land, and each plow oxen serves 23.3 mu of cultivated land. The burden on both the work force and animals is lower than the average for the province as a whole. However, great imbalances exist. Pingxiang County carries a fairly light burden with each member of the work force being responsible for fewer than 2 mu. Jinggangshan carries the heaviest burden, with each member of the work force being responsible for 5.89 mu. Pingxiang is also the county that places the lightest burden on plow oxen, each head serving 19.3 mu. The county that places the heaviest burden on plow oxen is Xiushui, where each draft oxen farms 30 mu of land. Farm mechanization has steadily increased in recent years, and both the amount of chemical fertilizer and rural use of electricity have risen steadily, too, giving very great impetus to development of agriculture. According to 1979 statistics, the whole region had farm machines with a total of 581,000 horsepower, which was an average of 1,054 horsepower per 10,000 mu. The machine-cultivated area was 1.31 million mu, which was 23.8 percent of the cultivated land area. Chemical fertilizer use averaged 88 jin per mu, and rural electricity use reached 88.93 million kWh, or an average of 16.1 kWh per mu. This was slightly higher than the average for the whole province, but great variations existed between one county and another.

B. Commune and brigade enterprises have developed rapidly. In 1979, the region's commune and brigade enterprises grossed 320 million yuan. This was an average 76 yuan per capita of agricultural population, and much higher than the average 44 yuan for the province as a whole, giving the

region first place in the province. This is an extremely favorable condition for the region's development of agricultural production. Commune and brigade enterprises have placed a substantial role in providing funds, material resources, and farm machinery for agriculture.

This region has fairly plentiful supplies of minerals and fuels for making fertilizer. Coal is found along an area running through Pingxiang, Yichun and Lianhua counties where it is fairly widespread. Not only do large industries mine it, but numerous communes and brigades also operate small coal mines. This plays a very great role in development of the "five small" local industries (small chemical plants, in particular), and in meeting needs for fuel for agriculture itself. Phosphate rock is found over a fairly wide area. In virtually every place having quarries, phosphate rock with a fairly high phosphate content and potash-containing rock clay can be found. Limestone is found mostly in Pingxiang, Yichun, Wanzai, Fenyi and Yifeng counties. Dolomite is found in the Meng Mountain region, and it contains large amounts of magnesium oxide. Gypsum rock is found in Wanzai and other counties. In virtually every place having granite, potash can be found, Fengxin and other counties having a fairly large amount of it. Peat is even more plentiful, occurring in almost every county. These fertilizer resources require only a little processing to make calcium, magnesium, phosphate, potash and ammonium humic acid. Moreover, all jurisdictions can manufacture them and provide favorable conditions for exploitation of fertilizer sources.

Second Section. Current Status and Characteristics of Agriculture, and Variations Within the Region

1. Current Status

This region is one of the old revolutionary bases that sustained cruel encirclement and suppression at the hands of the Kuomintang reactionaries, causing extremely great damage to agricultural production. Following liberation, both party and government devoted extremely serious attention to reconstruction of the base, and after nearly 30 years of effort, the region's agricultural production conditions have been very greatly improved, a substantial rise in production levels has occurred, and farming, forestry, animal husbandry, sideline occupations and the fishing industry have developed to varying degrees. As a result of the effects of natural and socioeconomic conditions, agricultural production has the following several characteristics:

A. Fairly Rapid Development of Grain Production to a Fairly High Level, and a Small Percentage of Cash Crops

This is a farming and forestry area having a large population relative to the amount of cultivated land, cultivated land averaging 1.25 mu per capita of agricultural population in 1979. This was more than in southern Jiangxi, but less than in any other agricultural region. Farming

is the major agricultural sector of this region, and grain holds a commanding position in farming operations. In 1979, 4.54 million mu were planted to grain crops. This amounted to approximately 82 percent of the cultivated land area and 69 percent of the area sown to farm crops. Paddy rice was the principal kind of grain crop grown accounting for 88 percent of the area sown to grain crops. The total amount of other grain crops grown including sweet potatoes, miscellaneous grains other than wheat and rice, wheat and soybeans was less than 12 percent of the area sown to grain.

This agricultural region is one of those in the province in which grain production has developed fairly rapidly and to a fairly high level. In 1979, grain output totaled 4.15 billion jin, and yields averaged 913 jin per mu. This represented an increase in total output of 2.9 billion jin over 1949. The region held first place in the province in both speed of development and averageyields per mu. In 1979, grain yields averaged 943 jin per capita of agricultural population. The five counties comprising this region, namely, Fengxin, Shanggao, Yifeng, Wanzai and Yichun, are major grain-producing areas of the province. In 1979, gross output of grain from these five counties amounted to 1.83 billion jin, and the state grain purchases of unprocessed grain (including purchases at negotiated prices) reached 510 million jin, which was 44 percent and 57 percent, respectively, of totals for the whole region. Despite the fairly high level of grain production in this region, development within the region is very uneven. In high grain yield Pingxiang City, for example, yields an average 1,309 jin per mu, but are only 553 jin per mu in some counties such as Ninggang, a difference of more than 700 jin. Even in places having similar conditions, there are very great differences in production. Clearly this region still holds very great potential for grain production. In the future, it will be necessary to raise the level of scientific farming further, to rationalize the farming system, to expand the area sown, to promote the growing of hybrid rice, and to improve varieties for substantial increase in both yields per unit of area and gross output of grain. In addition, consideration should be given crop rotation between wetlands and drylands, and the need to both use and nurture the soil. In view of needs of the national economy and of the people's lives, the area sown to miscellaneous autumn grains should be expanded somewhat, and attention given to raising both yields per mu and output so that definite development occurs.

Historically, cash crops have accounted for a very low percentage of this region's farming industry. In 1979, 640,000 mu were sown to cash crops. This was only 5.1 percent of the total area planted to farm crops, about the same as for the eastern Jiangxi agricultural region, making these agricultural regions the ones with the lowest percentage of cash crops in the province. The area sown to cash crops was 110,000 mu less than in 1965, with very great declines in the growing of all cash crops with the exception of cotton, peanuts and tobacco, which increased in area. Of particular note was a 75 percent decline in the growing of ramie.

Historically, ramie has been a traditional cash crop in this region that has been grown for a very long time and is of renowned quality. Wuning, Xiushui, Yichun, Fenyi, Shanggao, Wanzai and Pingxiang counties in this region have always been key ramie-producing counties (or cities) in the province. In 1965, these several counties accounted for one-third of the province's total output. In recent years, ramie production has risen and fallen precipitously, and the extent of decline has been substantial (See Table 4-3). This has resulted primarily from failure to implement policies, reduction in the area sown, and growing over a scattered area, which has made it difficult to increase both gross output and yields per unit of area. The only two counties in which ramie is grown on more than 1,000 mu are Yichun and Fenyi. It is grown on more than 500 mu in Wuning and Shanggao counties, and on more than 100 mu in Xiushui, Yifeng and Wanzai counties. Elsewhere, it is only grown here and there, and may be frequently apportioned among numerous communes within a single county. As a result, it is virtually impossible for the state to buy hemp bark in some places. This state of affairs requires vigorous measures for gradual change. In order to quicken the pace of production of the traditional cash crop that ramie is, the following should be done in the future: (1) Watch implementation of policies, being particularly sure that grain rations of ramie farmers are no lower than those received by communes and brigades that farm grain. Furthermore, since ramie consumes much manpower, and since costs are high, the state purchase price should be raised in order to stir peasant enthusiasm for ramie growing, and the state should also help out with fertilizer and materials for an expansion of the growing area. (2) Proper concentration of the growing area would help raise the level of care and the commodity rate. It is recommended that communes and brigades having suitable natural conditions (mostly low mountain and hill regions), and a fairly plentiful supply of labor be selected for establishment of ramie bases that are 1,000 mu or more in area. In addition, some wasteland that has a gentle slope, good water drainage conditions, a deep soil layer, and is not windy should be selected for reclamation and concentrated growing of ramie. Some key places for the growing of ramie should convert the areas they currently devote to the growing of jute and ambari hemp to the growing of ramie. (3) Scientific research on the growing of ramie should be intensified, and placed in the hands of specialists. Existing superior varieties such as Tongpiqing and Huangpi from Yichun County should be further selectively bred, purified and rejuvenated. In addition, attention should be given to sensible selection of ramie fields and development of the intercropping of ramie and grain for increased yields of both grain and ramie.

B. One of the Province's Major Bases for the Production of Wood, Bamboo, Tea Oil and Tea

Forestry resources are extraordinarily abundnat in this region. According to 1975 statistics, the region had 19,445,000 mu of forest area, which was about 21.1 percent of the province's total forest area, and a 45 percent forest-cover rate. This included 13,005,000 mu of timber forests, which was 67 percent of the forest area; 4,139,000 mu of economic forests, which was 21 percent of the forest area; and 2.11 million mu of moso bamboo forests.

Table 4-3. Comparison of Ramie Yields Per Mu for 1949 and 1979

Units: Jin

县别 a) \ 年份 b)	1949年	1979年	c) 历史最高
d) 宜春	60	102	179 (1971年)
e) 万载	43	113	165 (1954年)
f) 上高	67	77	111 (1958年)
g) 分宜	70	94	109 (1974年)

Key: a) County
b) Year
c) All-time high
d) Yichun
e) Wanzai
f) Shanggao
g) Fenyi

The greatest proportion of timber forests were of China fir, which covered 6,374,000 mu, or 48 percent of the timber forest area. Pine accounted for 30 percent. The whole region had 58,189,000 m^3 of live timber reserves, which was approximately 22.16 percent of total live timber reserves in the province. This included 19,960,000 m^3 of China fir forests, 11,109,700 m^3 of pine, and 250,789,000 stalks of moso bamboo. Though this region has fairly abundant timber and bamboo resources, the proportion of its mature forests is not high, and distribution is uneven. A 1975 survey showed 36 percent of timber forests to be young, 45 percent to be of middle age, and only 20 percent mature. Less than one-half the mature trees in mature forests were firs. Bamboo resources are fairly concentrated mostly in several mountainland and hill counties such as Tonggu, Yifeng, Jing'an, Fengxin, Wanzai, Wuning, Xiushui and Jinggangshan, and fir forests are even more concentrated. Following long development, places currently having fairly convenient transportation are pretty well lacking in forestry resources, or even firewood has become a problem. In distant mountain regions, however, some overly mature forests have not yet been exploited.

Since founding of the People's Republic, the building of forestry has been intensified, many state-owned forest farms and land reclamation farms have been established, and both the number of commune and brigade forest farms and the size of the specialized forestry crops have expanded steadily. Forest region capital construction has been greatly intensified. The degree of mechanization of forestry, the level of administration and management, and the multiple-use rate for timber have risen substantially. Harvesting of trees has gradually changed from the former selection of trees of a certain girth to cutting of all trees on a small tract. Afforestation has gradually developed from the former small, scattered tracts to afforestation of concentrated, continuous-tract timber forest bases. A few score tracts of China fir

timber forest bases have been established, and the artificially afforested preserve area has grown to 3,825,000 mu. The amount of marketable timber provided the country has increased year by year. According to statistics on Jing'an, Tonggu, Fengxin, Yifeng, Wanzai and Yichun counties, an average of 250,000 to 260,000 m^3 of timber and 3.4 million stalks of moso bamboo have been annually provided the country ever since 1975. During the highest year, annual output of marketable timber reached 400,000 m^3, but a decline has taken place in recent years.

Land currently used for forestry in this region amounts to 71 percent of the total land area. In addition to the 45 percent that is used for forests, another nearly 10 million mu of the land used for forestry is awaiting planting and improvement. Potential for development of forestry is very great. This region has always held an important position in the province in the growing of tea oil trees. In 1965, for example, this region produced 585,100 dan of tea oil seeds, or approximately 28 percent of the provincial total. In 1979, tea oil seed output reached 1.16 million dan, or approximately more than 30 percent of the provincial total. Tea oil forests are found mostly in Yichun, Pingxiang, Fenyi, Shanggao, Wuning, Xiushui, Yongxin and Lianhua counties. Since old forests have not been promptly replanted and renovated in recent years, and since new afforestation has proceeded fairly slowly, the increase in tea oil seed production has slackened. For example, though Yichun County ranks first in tea oil output, it has yet to revive the all-time high level it achieved (in 1958). In addition, forestry by-products, such as dried bamboo shoots, mushrooms, wood fungus, and pine resin, have also always been traditional products of this region, and have held a position in the province. Their development has been fairly slow in recent years, however, as a result of failure to implement policies, and improper handling of conflicts in assignment of work forces and between forestry and the growing of grain.

This region is a major tea-growing area in the province that is second only to eastern Jiangxi. Not only does it produce "Ninghong" tea, which is famed both in China and abroad, but other green teas are also of superior quality. Since founding of the nation, both growing and processing of tea have grown fairly rapidly. In 1979 the region had an area of 200,000 mu in tea plantations, and tea output totaled 35,900 dan. It was grown mostly in Xiushui, Wuning, Tonggu, Pingxiang, Wanzai and Yongxin counties. Because state procurement prices paid for "Ninghong" tea have been overly low in recent years while procurement prices paid for internally marketed green teas have been relatively high, the trend has been toward a conversion of areas formerly growing black tea to green tea. Procurement prices paid for black tea should be properly increased, and the traditional growing of black tea revived. Xiushui, Wuning and Tonggu may be selected as counties for the building of a series of bases with an annual output of more than 50,000 dan.

In addition, this regionis also the major area growing silkworm mulberrys in the province. In 1977, the mulberry grove area was 4,211 mu, or more than one-third of the total for the province. Production is largely concentrated in Xiushui, Yongxin and Pingxiang counties, particularly in Xiushui County where the mulberry grove area is 2,235 mu. Silkworm mulberry production has always held an important position throughout the province, and it should be properly developed in the future.

This region has a large mountainland area with plentiful medicinal herbs, the number of famous ones running to no fewer than 100-plus varieties. In 1979, a nearly 10,000 mu area in the region was devoted to growing them. This was 16 percent of the total growing area in the province. Mostly they were grown in Xiushui, Yichun, Pingxiang, Wuning and Tonggu counties, and the masses in these counties were accustomed to growing them. In the future, research in their cultivation should be further strengthened; they should be constantly purified and domesticated; crop patterns should be made rational; and a good job should be done in processing and purchasing them in order to promote development of medicinal herb production.

C. Fairly Good Foundation in Animal Husbandry Production, But Low Level of Fishing Industry Production

With development of agricultural production, particularly steady growth in grain production, very great development has taken place in the regions animal husbandry production, which is dominated by hog raising, and a definite foundation already exists. In 1979, the number of hogs in inventory reached 1.76 million head, a 4.6-fold increase over 1949, and a 64 percent increase over 1965. This amounted to 0.32 hogs per mu of cultivated land area for first place in the province. It averaged 0.4 head per capita of agricultural population for second place in the province. It was a fairly high level for the central region. By contrast, the raising of plow oxen developed relatively slowly. In 1979, there were 300,000 head (the number in inventory at yearend), a rise of only 4 percent from 1965. This is a hill and mountain region in which the water surface area is relatively slight and in which fishing industry production relies mostly on breeding. In 1979, the region's output of aquatic products was 107,700 dan, which was only slightly higher than for the central Jiangxi agricultural region, a relatively low production level. Breeding of aquatic products is pretty well concentrated in Pingxiang County, which accounts for one-third of the total for the whole region with an output of 33,000 dan annually. Counties with an annual output of more than 10,000 dan include Yichun, Yongxin and Wuning. Currently, supplies of aquatic products are far from able to meet market demand. Water surfaces must be used to the full, and vigorous development done with emphasis on increasing yields per unit of area.

2. Variations Within the Region

The western Jiangxi farming and forestry region extends across more than three degrees of latitude from south to north. With the region terrain is complex and agricultural production conditions are markedly different. The whole region may be divided into the following three subregions on the basis of differences in agricultural production conditions, characteristics, and the direction of development:

A. Northern Timber and Bamboo, Paddy Rice, and Tea Subregion

This subregion is located in the northernmost part of the western Jiangxi agricultural region and includes Xiushui, Wuning, Tonggu, Jing'an, Fengxin, and Yifeng counties with a land area of approximately 14,514 sq km.

1. Agricultural Production Conditions

(1) In the northwest in Mufu Mountain; in the south in Jiuling Mountain (including part of the Jin River valley), and in between is the Xiushui River valley. The topography of the entire subregion is dominated by a valley sandwiched in between two mountains, mountainlands and hills predominating, plus a narrow plain, and relatively plentiful mountain forest resources.

(2) Since latitude of the subregion is somewhat north and the terrain fairly high, temperatures are the lowest in the region and in the province alike. Annual temperature averages 16.4° to 17.3°C, and January temperatures average 3.9° to 5°C, going down to -9.8° to -13.5°C at the lowest. Heat resources are relatively scant, and the crop-growing season is fairly short. The frost-free period is 5 days shorter than elsewhere and dynamic cumulative temperature; ranges from 180! to 400°C less than in other subregions. Every year "cold dew winds" also arrive fairly early. In Xiushui County, for example, the average arrival date is 29 September, and the earliest is 14 September. As a result, the farming system if mostly one crop a year, and the multiple-cropping index is relatively low.

(3) Within the region are numerous small basins, the terrain being high all around and low in the middle. Most of the rivers rise in the surrounding high mountains and feed toward the center like the spokes of a wheel. Because of the rapid flow of streams down slopes plus the numerous torrential rains in mountain regions, the rivers rise and fall sharply. Since water conservancy construction is fairly lacking, many fields are prone to the threat of flooding and waterlogging. This is particularly the case in Xiushui County where the water conservancy foundation is poor and ability to withstand disasters weak. Frequently a 50 mm downpour of water will mean disaster for some fields. On the other hand, waterpower is extraordinarily plentiful, and numerous good sites exist for the building of dammed reservoirs. Potential for development of small-scale hydropower is very great.

(4) The low-yield field area is relatively large, and some area are fairly seriously eroded. All kinds of low-yield fields are found over a fairly wide area in all counties. For example, 1978 statistics for Xiushui County alone show about 100,000 mu each of cold pasty fields, sandy fields, and fields hanging from mountain walls. Some counties and communes have been rather seriously eroded. Statistics show an almost 270 square mile erosion area throughout the subregion in 1978, with erosion being particularly serious in the granite mountainlands and hills of Baisha Ling in Xiushui County. Actual measurements of silt content at the large bridge across the Xiu River showed 13.7 kg/m^3. This has caused a construction of the flood channel, thus intensifying the flood hazard.

(5) Relatively short supply of manpower and animal power. On average, each member of the work force serves 5.18 mu of cultivated land, and each plow oxen serves 29 mu. This is the subregion of the western Jiangxi agricultural region with the greatest shortage of manpower and animal power. Furthermore, distribution is uneven. In some places, population is large relative to available land to the point that mountain slopes with a gradient of 30 to 40 degrees or greater have been reclaimed for cultivation (as fields hanging from mountain walls). In some other places (such as in parts of Tonggu County), population is scant relative to land. Only farming is done to the neglect of other forest sideline occupations.

2. Characteristics of Agricultural Production

(1) The principal grain crops is paddy rice, but a certain percentage of sweet potatoes, wheat, and miscellaneous grains (such as corn) are also grown. According to 1979 statistics, more than 90 percent of the grain crop area was sown to paddy rice; 4 percent of the total grain growing area was sown to sweet potatoes; 4.4 percent was sown to miscellaneous grains, and a fairly large percentage was sown to wheat, which was somewhat higher than for other subregions. Formerly this was a single-crop rice-growing area, with late rice being grown as a second crop on only 20 percent of wetlands in 1956. Growth has been fairly rapid in recent years, with the area sown to late-crop rice in a two-crop system occupying 60 percent of the wetland area.

(2) The growing of world-renowned "Ninghong" tea is concentrated largely in this subregion. In 1979, there were 158,000 mu of tea plantations producing approximately 30,000 dan annually. This was 77 percent of the total growing area of the entire agricultural region, and 84 percent of its output. The region has superior conditions for development of tea production, and potential is very great. However, as a result of failure to implement policies, output of "Ninghong" tea has declined seriously in recent years. Medicinal herbs are also an important cash crop of this region, with a 5,258 mu area having been sown to medicinal herbs in 1979. Though the area sown to cotton is not large, amounting to only 24,000-odd mu, nevertheless it holds an important position within the

region, and accounts for virtually more than three-fourths of the western Jiangxi agricultural region's total cotton-growing area. In addition, the famed Hangkou hogs from Xiushui County, which have a thin skin, tender flesh and grow rapidly, are among the superior hog breeds in the province.

(3) Forestry and forestry byproducts hold a very important position in the province. The forest cover rate is very high, particularly in Tonggu County where it reaches 64 percent, the highest in the whole province. The proportion of mature forests is greatest in this region, and their exploitation value is great. Forestry byproducts have always been a traditionally important product of this subregion; however, their development has been slow and output not very high in recent years.

3. Direction of Development and Actions To Be Taken

Simultaneous with energetic development of grain production should be further development of forestry (including forestry byproducts), as well as special products such as "Ninghong tea," medicinal herbs, and Hangkou hogs as a means of increasing economic diversification. This should be the major direction of future agricultural production in this subregion. In both forest areas and in key "Ninghong" tea-producing areas, forests or teas should predominate in a linking of forests and grain production and tea and grain production. Serious attention should be devoted to the following points:

(1) Vigorous building of water conservancy to overcome the threat of floods and waterlogging. Emphasis in farmland capital construction should be on improvement of the large areas of "three running fields," and the cold, pasty, low-yield fields. This region has relatively good conditions for the building of reservoirs, and in addition to building some projects of a control nature, more medium and small reservoirs and dammed ponds should be built, and the plentiful waterpower resources put to use in development of hydropower and irrigation endeavors for multiple uses.

(2) The main emphasis for grain crops should be increases in yields per unit of area. Reform of the farming system should suit general methods to specific circumstances for positive safety of food supply. Mountain regions should mostly grow a single crop of hybrid rice, raise the level of scientific farming and strive to overfulfill the single-crop "National Program for Agricultural Development." Sweet potatoes, corn, wheat, and potatoes are early grain crops that this subregion has grown traditionally. Practice has demonstrated that places having insufficient water or poor water conservancy facilities, particularly some fields on mountain stream banks and "fields that depend on the skies for rain" should suit general methods to specific circumstances in planting. They should adjust themselves to mountain region weather conditions and the farming practices of the masses as an advantageous way in which to plan crop succession, institute crop rotation between wetlands and drylands, and to link use and nurture of the soil. They should not ill-advisedly change the growing of paddy.

(3) Eroded areas should resolutely close off mountains and carry out afforestation. They should shift the focus of felling to distant mountain regions having plentiful resources. The area growing "Ninghong" tea should be properly centralized, scientific research intensified, and scientific tea growing done well.

(4) Satisfactory solution to the problem of "fields that hang along mountain walls." In principle, the stage should be gradually set (such as through increasing yields per mu, and solving grain-ration problems) for a retreat from reclamation and a return of such fields to forests for development of forestry.

B. The Central Paddy Rice, Oil and Hemp Subregion

This subregion includes Pingxiang City, Yichun City and Yichun, Wanzai, Fenyi and Shanggao counties with a land area totaling approximately 9,690 sq km.

1. Agricultural Production Conditions

(1) Central Pingxiang, Yichun and Fenyi are traversed by the Yuan River. Except for the south and the northern fringes, which have mountainlands, this subregion consists mostly of hills and river valley plains. Wanzi County is mostly mountainlands and hills, and also has a small number of plains. Conversely, Shanggao is virtually all hills and plains. The terrain of the river valleys of the Yuan and the Jin are flat, cultivated land is concentrated and irrigation conditions are good. However, both are places where water conservancy problems have not been completely solved, and vast limestone hill regions are prone to drought hazards.

(2) Since the latitude of this subregion is somewhat to the south and the land is fairly low, the climate is temperate and the growing season is long. Cumulative temperature averages 5,445-5,556°C, which is suitable for the growing of three crops.

(3) Population is large relative to available land, cultivated land averaging fewer than 3 mu per capita of the work force. Industries, mines, cities and towns are fairly concentrated within the region, and conditions are relatively good for industry to assist agriculture. Commune and brigade enterprises have developed rapidly, and both the extent of mechanization and quantities of fertilizer used are fairly high. In 1979, commune and brigade enterprise gross earnings reached 275 million yuan. This was 85 percent and 22.7 percent, respectively, of earnings for the entire agricultural region and the whole province. Average income reached 117 yuan per capita, 2.66 times higher than the average for the province as a whole. Pingxiang City was special with a income of 194 yuan per capita, and gross earnings of commune and brigade enterprises there reached 186 million yuan. In recent years, the county has annually allocated 8 to 9 million yuan as assistance to agricultural production, and this has played a major role in development of farm machines, in increasing supplies of chemical fertilizer, and in promoting bumper agricultural harvests.

2. Characteristics of Agricultural Production

(1) The three-crop area is fairly large, and grain yields per mu are fairly high. With steady improvement in agricultural production conditions since liberation, the farming system has been steadily reformed, a three-crop system of "wheat-paddy-paddy," or "oil-bearing crop-paddy-paddy" has spread very rapidly, and the multiple-cropping index has greatly increased. In 1979, the multiple-cropping index for the entire subregion was 250 percent (including green manure). With reform of the cropping system, plus the habit of intensive farming in this subregion, grain yields per unit of area have been very high, reaching 1,134 jin per mu in 1979, making this subregion the one in the western Jiangxi agricultural region and in the whole province with the highest yields per unit of area.

(2) An important area of the province for tea oil production. This subregion has been in the habit of and has experience in the growing of tea oil. Its tea oil forest area is very large at approximately 2.18 million mu, or 15 percent of the total for the whole province. In 1979, more than 820,000 dan of tea oil seeds were produced. This was approximately 21 percent of the total for the province as a whole. Yichun County alone produced more than 7.9 million jin of tea oil, an average of 13 jin per capita of agricultural population. It sold the state more than 3.6 million jin of tea oil, an average of 6 jin per capita for first place in the whole country.

(3) Ramie has been a traditional special product of this subregion that is of good quality, large quantity and of great reputation. However, during the past more than 10 years, the growing area has declined greatly as a result of failure to carry out policies.

(4) Forest resources are relatively slight, but the amount of felling has been relatively large.

3. Direction of and Measures for Development of Production

This subregion has a fairly large population; industrial and mining enterprises are well-developed, and the percentage of the nonagricultural population is relatively large, amounting to 16 percent in 1979. Thus, simultaneous with great future efforts to increase grain production, it will be necessary to revive and develop cash crops, as well as to produce nonstaple foods, including vegetables, fish and meat, in order to satisfy the needs of people in industry, mining, cities and towns. Traditional ramie production will also have to be actively revived and developed. At the same time, vigorous efforts will have to be made to grow timber forests, to renew and reclaim tea oil forests, and to develop fruit orchards and other economic forests.

In order to further improve both yields per unit of area and output of grain crops, the percentage of the three-crop system can be appropriately expanded in places having a large population relative to cultivated land,

relatively good water conservancy and fertilizer conditions, and a tradition and experience in the growing of three crops (such as Pingxiang County). Particularly serious attention should be given to development of the three-crop system of "oil-bearing crop-paddy-paddy" to help link use and nurture of the soil.

In addition, major effortd should be made in farmland capital construction for further improvement in agricultural production conditions. Though this subregion's water conservancy conditions are better than other subregion's, nevertheless, there are still quite a few problems, such as the proneness to drought of some hill region cultivated land (particularly in limestone hill regions). In addition, between 60,000 and 70,000 mu of cultivated land is prone to waterlogging. At the same time, every county has a fairly large area of "three running fields," and "fields hanging on mountain walls" awaiting improvement. In some places with a good basis in water conservancy and a large population relative to cultivated land, higher standards should be employed in farmland capital construction. Advanced irrigation techniques such as spray irrigation should be adopted in order to conserve soil and raise the water utilization rate.

C. The Southern Paddy Rice, Rape and Bamboo Timber Area

This subregion includes Lianhua, Yongxin and Ninggang counties, plus the Jinggangshan Administrative Bureau with a land area of 4,514 sq km. This subregion is located in the middle part of the Luoxiao Mountain Range. Most of the terrain is hills and basins with the exception of Ninggang and Jinggangshan, which are part of the Wanyang mountainlands, and northeastern Lianhua, which is dominated by the Wugong Mountains and has lofty mountain ranges.

1. Agricultural production conditions

(1) Most of Ninggang County and the Jinggangshan Administrative Bureau consists of a medium and low mountain area in which medium mountains are more than 800 m high and their soil cover shows a definite change with vertical rise. Forest resources are plentiful, principally China fir, pines and bamboo. The farmland type is mostly alluvial sunken fields. In some mountain basins and river valley lowlands in low mountain areas, fairly level large, flat fields and fields on mountain stream banks are found. The situation here is generally very similar to that in the mountainland type region.

(2) Very widespread distribution of hills and downlands. Most of the hills here have a gentle slope and a relative elevation of approximately 50 m. In most cases, the gradient is 15 to 20 degrees. The mother material is arenaceous rock and red sandstone for the most part. The soil is thick, favoring the growing of tea oil forests and other fruit trees. Historically, tea oil has been grown, and the growing area is relatively large at approximately 637,000 mu. However, at the present time there are many old forests and remnant forests or secondary growth.

Since streams flow only a short distance in basins, water is insufficient, and conditions for the building of reservoirs in the hills are poor. This inhibits water storage. Diversion of water has to be done from a great distance, and water conservancy projects are few; thus, the threat of drought exists everywhere in varying degrees. This is a prominent contradiction in current development of agriculture.

(3) This subregion is located at the southernmost part of the western Jiangxi agricultural region and has Wugong Mountain to the north to block cold air currents. The climate is warm and heat resources are fairly abundant. Except for mountain regions such as Jinggangshan, the growing season where average temperature is stabilized at 10°C or above is between 244 and 250 days, and cumulative temperature is 5,353.5-5,831.4°C, sufficient for the growing of two crops of paddy and a three-crop farming system. However, for reasons having to do with water conservancy, the labor force and fertilizer, the percentage of double crops of rice is not high. In 1979, late paddy in a double-crop system was grown on 62 percent of the wetlands area.

(4) Except for Jinggangshan, there is no shortage of labor. On average, each member of the work force serves 4.1 mu of cultivated land, and each plow ox serves 16.3 mu. However, overall use of work forces in this region remains irrational; consequently, economic diversification has not developed rapidly, and grain yields per unit of area are not high.

2. Characteristics of Agricultural Production

This subregion is an old revolutionary base that sustained cruel encirclement and suppression at the hands of the Kuomintang reactionary clique, causing grievous damage to agricultural production. Despite revival and development following liberation, production levels remain relatively low today. Farming is preeminent in this agricultural subregion, and paddy is the most important farm crop. In 1979, yields averaged 770 jin per mu, vastly lower than the average for the region as a whole. Most important cash crops are rape, sun-cured tobacco and cotton, most of which are produced for self-sufficiency. The mountain and hill area of this subregion is large, with timber, bamboo and tea oil trees found over a wide area, especially in Ninggang and Jinggangshan in the south, which is one of the western Jiangxi agricultural region's major areas for timber and bamboo production.

3. Direction of Development of Production and Measures To Be Taken

First of all, potential for increased yields must be tapped to the full to raise grain yields per unit of area. With further improvement in water conservancy conditions, the three-crop farming system of "oil-bearing crop-paddy-paddy" can be expanded as feasible in order to raise the soil-utilization rate. In addition, there should be further development of economic diversification, principally through timber forests, tea oil, fruit trees, tea and animal husbandry. This subregion has numerous scenic revolutionary sites offering broad prospects for development

of tourism. Thus, attention should be given to development of nonstaple food production and the growing of scenic forests, plus good performance in production of traditional forest byproducts. This subregion has a very large hill region that should be used to the full. Since water conservancy conditions lag behind for the moment, dryland crops will have to be developed first. In order to allay the threat of drought in hill regions, full equipping of existing water conservancy projects must be done, and large-scale efforts made to build mountain pools and reservoirs.

Third Section. Several Problems in Further Development of Agricultural Production

1. Problems in Accelerated Building of Timber Forest Bases

The western Jiangxi agricultural region is one of the province's timber bases in which there are plentiful forest resources and a fairly good foundation for forestry. Since liberation, afforestation, building of a forestry corps, scientific forest operation, forestry mechanization, multiple uses of timber, and the level of forest administration and management have all seen fairly rapid development and upgrading. Nevertheless, numerous problems exist. In order to accelerate the building of timber forest and woody plant oil bases, equitable solutions must be found to the following several problems on the basis of actual current production conditions in the region:

A. Comprehensive Planning for Development and Equitable Use of Forest Resources

For a long time, serious problems have existed everywhere in use of this region's forest resources that are attributable to chaotic management, multiple authority for access to mountains, administration by several organizations, unbridled felling, unplanned production and reckless cutting. As a result, forest resources have sustained fairly great damage, and in many places forest tree growth cannot keep up with the volume of cutting. The proportion of mature China fir forests has declined, and the prospect of "perpetual use" has been called into question. The situation in recent years has shown that the amount of nonplan timber reaching society through various channels in all forest areas far exceeds the amount of state plan marketable timber. For example, the state plan calls for 60,000 m^3 of timber annual from Jing'an County, but the timber consumed by commercial departments alone for production of wood and bamboo manufactures amounts to more than 90,000 m^3. As another example, rough calculations made by the Tonggu County Forestry Bureau show that the county sells the state 55,000 m^3 of timber annually, but that approximately 180,000 m^3 or more are cut. In addition to the portion sold locally, 60,000 m^3 is burned as firewood, 30,000 m^3 is used as fuel for brick and tile kilns, and more than 30,000 m^3 is natural loss. Even more serious is the irrational felling methods of "pulling out large hairs and selecting the fittest" that plunders China firs, with the result that the percentage of mature China fir forests

has declined dramatically. In some places, there is virtually on timber remaining to be cut. In addition, as a result of the intense cutting of China firs, artificial afforestation has been unable to keep pace. Since natural renewal of broadleaf forests and scrub growth is greater than natural renewal of China firs, there is a great uneveness in the appearance of forests in many places and forest quality has dropped. A situation has resulted in which "mountains appear to be green when looked at from afar, but a close look shows no timber."

The irrational use of forest resources is also manifested in the felling of forests not being related to the distribution of forest resources. As a result, few mature forests exist or there may even be a shortage of timber and firewood in nearby mountains having convenient transportation, while mature forest tree resources located deep in remote mountains not accessible to transportation are wasted for failure to cut and haul them away on time. Furthermore, as a result of the irrational pattern of felling zones, production costs rise and output value falls.

Satisfactory solution to the foregoing several problems will require resolute implementation of the "Forest Law," strengthening of forest management, and calling a halt to unhealthy tendencies toward reckless cutting and denudation. In addition, there will have to be formulation of all-around plans based on thorough investigation and study, and adoption of the following specific measures:

1. Adherence to rational felling. Practice has demonstrated that the method used today in all forest areas of "cutting everything in small areas, followed by complete clearing of mountains and artificial reafforestation is an effective way of doing things. This method has the advantages of very quickly transforming the undesirable forest trees consisting mostly of pines and miscellaneous trees and quickening the pace of forest renewal. Forestry units in Yongxin and Wanzai counties have come to believe that use of this method of afforestation promotes quick growth, shortens the period till maturation, and produces yields per unit of area that are twice to three times or more greater than for natural forests, and that the amount of felling increases by 60 or 70 percent over the selective cutting method. Furthermore, this method favors mechanization of production. However, soil and water conservation must be watched. Given natural conditions in this region, if mountain slopes with a gradients of under 35 degrees are completely cleared and reafforested after small areas have been completely cut over, the ground cover will revive very quickly. Within 3 to 5 years after artificial planting of saplings, trees will form a canopy, and no great amount of erosion will occur. The tops of mountain slopes with a gradient greater than 35 degrees are suited to the growing of broadleaf trees, pines and miscellaneous trees. Here selective cutting may be done, but a certain number of mother trees must be preserved. On fairly craggy steep slopes where forests conserve water and soil, no complete clearing should be done. There is to be only cutting to sustain growth or cutting for replacement.

Forest regions where the makeup of forests is fairly helter-skelter, and naturally sparse forest zones will have to be actively transformed. In principle, the main method should be closing off mountains to nurture forests, with artificial afforestation used as a supplement. Right now, it is also necessary to reduce the amount of felling of China firs, and to increase the amount of pines and miscellaneous trees that are cut. Some people have proposed a limitation on the intensity of China fir cuttings at about 50 percent, or a halt to the cutting of China fir for a time in places where they are in fairly short supply so as to allow them to revive.

2. Rational readjustment of felling zone patterns. The pattern of forest resources distribution in this region is uneven. Take China firs, for example. Today, a fairly large proportion of live reserves are found deep in the mountains where the number of mature trees are fairly numerous, where forest growth is even, and where the tops of forests form a large canopy area. This is the case at Xixiang, Yuju and Qiping in Tonggu County, at Laibao, Zhoufang, and Sangualun in Jing'an County, at Huangsha in Xiushui County, at Guanshan and Huanggang in Yifeng County, and at Shixi, Qili and Xita in Fengxin County where forest resources are fairly abundant. In some low mountain and hill regions, however, forest trees are few and consist mostly of middle-age or young trees that are not very large in diameter. In some places having easily available transportation, virtually no forest trees are left except for some recently afforested young China firs. In view of this situation, the emphasis for future felling should be shifted to distant mountain regions where forest resources are plentiful, and the tendency to cut nearby forests but not distant ones and to cut the easy but not the difficult should be overcome. Transportation and forestry machines should be actively developed in order to shift the emphasis in felling toward distant mountain regions. By so doing, not only will it be possible to make better use of deep mountain region forest resources, but also allow time for excessively logged areas to rest and recuperate and forestry resources to revive. The state should provide all possible financial assistance to encourage a shift of major felling zones to remote mountain regions.

3. Strengthening of the planning of logging. Waste of timber is serious in every forest region today, and this situation is closely related to the lack of planning in logging. In the future, there must be thorough investigation and study and the seeking of truth in facts for the formulation of rational felling plans so that only the amount of timber that the state needs is cut, and so that no more is cut than can be hauled. The ill-advised reckless cutting that results in rotting and deterioration of timber must be resolutely overcome.

In addition to the foregoing, it is also necessary to find satisfactory solutions to disputes over mountain forests that have been inherited from the past, thereby strengthening unity, protecting forest resources, and advancing development of socialist forestry.

B. Further Implementation of a Program for Building Forestry Production of "Taking Forest Management as the Basis, Simultaneous Afforestation and Care, More Afforestation Than Felling, a Linking of Felling and Planting, and All-round Use" To Quicken the Pace of Afforestation

Since liberation, artificial afforestation has scored quite a few accomplishments in this region. Today, the region has an approximately 3.83 million my artificially afforested preserve area, 3.29 million mu of which is mature forests including 1.49 million mu of timber forests and 1.61 million mu of economic forests. Nevertheless, this is still a long way from meeting needs for development of forestry as contained in the "National Program for Agricultural Development," and development is fairly slow. Currently the region has a total of approximately 5.67 million mu of barren mountains and wasteland suitable for forests, and the greening of the four besides still has a long way to go. Because quality of artificial afforestation has been fairly poor in numerous places, growth has been fairly slow and very uneven. This is conspicuously manifested in a very low proportion of forest reserve areas. For example, in Yongxin County, where afforestation of the state-owned reclamation farm was done fairly well, the afforested preserve area is no more than about 50 percent, and in some places a situation has occurred of "afforestation year after year with no forests to show for it." In order to quicken the pace of afforestation, the following several actions must be taken.

1. Simultaneous with development of state-owned forest farm afforestation should be emphasis on development of commune and brigade collective afforestation. Since liberation, this region's state-owned reclamation farms and forest farms have played a dominant role in the building of forestry production, and this must be strengthened further. However, for various historical reasons, mountain rights in this region belong mostly to commune and brigade collectives; communes and brigades have a large labor force, and they also have experience in afforestation. Practice has shown that vigorous operation of commune and brigade forest farms and development of commune and brigade afforestation is an important way of relying on collective economic strength to achieve greater, faster, better and more economic results in "making the land into a park."

Commune and brigade afforestation has developed very rapidly in this region in recent years. Numerous experiences have been accumulated, and quite a few advanced units have emerged. One example was Tanfu Commune in Wanzai County, which resolutely instituted a program of "taking forests as the key link," using a combination of a mass movement and a specialized corps to achieve "good afforestation of a forest tract, leaving a team to care for it, operating a farm well, and taking good care of a mountain tract." Within 6 or 7 years since 1970, 35,000 mu of barren mountain slopes throughout the commune have been clad in green including the afforestation of 23,000 mu of China fir, most of which has formed a canopy.

Certainly commune and brigade afforestation efforts will encounter some problems, such as conflicts between forests and farms, the long production period required in forestry, inability to recover collective investment quickly, and certain difficulties with funds that will require appropriate financial assistance from the state. All economic policies will have to be carried out correctly, and satisfactory solutions will have to be found for problems such as how work forces will be assigned, intercropping of forests and grain, and development of economic diversification so as to promote faster development of commune and brigade afforestation.

2. Suiting of general methods to specific circumstances, rational patterns and suiting trees to the land. Today a situation of inequitable distribution exists in the afforestation of the region. For example, some places give no heed to habitat conditions. They plant China firs in an "arbitrarily uniform" manner, and one-sidedly pursue the growing of forests containing a single kind of trees, the whole mountain being a single color. Some do no unified planning of afforestation, and a confused pattern results. Afforestation is an important measure for transforming nature. The layout of forest land requires consideration of both socialist construction and the people's standard of living. Thus, it is necessary to suit general methods to loaal circumstances, to plan a rational layout, and to suit trees to the land on the bases of different landforms. A summarization from the masses that goes, "wear a pine tree hat on the head, a belt of China firs around the waist, and economic shoes on the feet," or "plant pines on mountaintops, plant firs in mountain depressions, mix in firs around the waist of mountains, and plant tea oil around the base" is a sensible pattern that is a dynamic capsulization of experiences in suiting trees to the land.

2. Problems in Building Tea Oil Forest Bases

This region has a vast hill and mountainland area, and soil resources suited to the growing of tea oil are plentiful. The broad masses of people have had a long tradition in and are accustomed to growing tea oil, and the region has always been a major one in the province for the production of tea oil. Tea oil forests are found everywhere in this region, virtually every county having them.

3. Problems in Development of Mountain Region Grain Production

This region has a broad mountainland area, particularly in Xiushui, Tonggu, Jing'an, Ninggang and Lianhua counties, where the mountainland area amounts to between 61 and 87 percent of the total area of each county. In these mountain areas today, however, the level of grain production is generally relatively low, and very great potential exists for increased yields. Efforts to raise agricultural production standards in mountain regions holds very major significance for hastening the building of mountain regions and promoting balanced increases in grain output.

In recent years, many counties are taking action on the basis of features peculiar to mountain regions to develop mountain region production. Fengxin County, for example, has guided agricultural production for the three types of terrain it contains--mountains, hills and plains--and has also set up a special mountain region agricultural research institute. Quite a few high-yield models have now emerged in the farflung mountain regions. For example, 10 households in Yuanjiang Production Team, Tangxi Production Brigade, Hongjiang Commune in Yichun County produced fine harvests a·eraging more than 1,000 jin per mu in high mountains and deep valleys where "there are many hollows in the Yuanjiang Mountains; slopes rise just outisde one's door; clouds lie beneath one's feet; and fields are nestled halfway up the sides of mountains." They demonstrated, thereby, that vast prospects exist for production of high grain yields in high mountain regions. For future increase in mountain region grain production, firm grip must be taken on the following:

A. Large-scale farmland capital construction centering around the digging of ditches and soil improvement to transform low-yield, cold waterlogged fields.

Most of the fields in this mountain region are of the alluvial ridge, mountain hollow, and mountain stream bank type. Field plots are scattered (as was the case with 59.2 mu of cultivated fields in Yuanjiang Production Team before improvement, when they were divided into 950 hillocks and scattered over more than 20 hollows and stretches of flatland divided by more than 40 mountain peaks); transportation is not well-developed; most are low-yield cold waterlogged fields, and production conditions are fairly poor. Soil is very poor in these kinds of low-yield cold waterlogged fields, and this is manifested principally in their being cold, sodden, toxic, acidic and infertile. After crops are planted in them, they do not easily sink roots; they green up only slowly and do not tiller; they mature slowly; and yields are very low, averaging only 200 to 300 jin per mu. The main trouble is an overaly high water table. As a result of long immersion in cold water, the soil particles in the muddy layer separate and become pasty. Soil structure is extremely bad; porosity is very poor; soil temperature is low; good micro-organisms are restrained, and effective nutrients cannot be released. On the contrary, toxic reduction materials clog the soil. However, all that is needed is the digging of ditches to drain the water in order to solve the problem of the excessively high water table, and these disadvantageous problems can be solved. Furthermore, the latent fertility can be brought into play with rather remarkable benefits for increased yields. Take the "winter melon pit" at Tangcheng Production Team in Xiyuan Production Brigade, Linghu Commune, Wanzai County where improvement of 20 mu of fields was done by digging ditches to drain away stagnant water. During the first year, yields increased 267 jin as compared with the period before improvement, and in 1977, yields reached 804 jin per mu.

The main specific ways in which various places have improved low-yield cold waterlogged fields have been as follows:

1. Digging of "three ditches" (drainage, irrigation and flood-diversion ditches), tackling the "five waters" (namely, mountain torrent waters, cold waterlogging waters, rusty water, ground water and irrigation water led along furrows in flood irrigation). An encircling ditch should be built around the foot of the mountain to separate mountain fields and to intercept mountain torrents and cold spring water so that they cannot enter fields. Ditches should also be dug all around field plots to prevent cold water from entering fields. The ditches that encircle fields should be deeper than the cultivated soil layer, and where the field plot area is large, a ditch should be dug through its center to lead away stagnant water and lower the water table. Depending on the shape of the field and the depth of mud in it, this ditch should be in one of the following shapes: a T, +, + +, or "丰", and the ditch should be lined with a protective stone wall. If the field contains the mouth of a spring, a ridge should be built up all around it to contain the water, and an underground ditch dug to carry the spring water out of the fields.

2. Building of an irrigation and drainage system to permit proper irrigation and drainage, and removal of anything that shades fields in order to raise the water and soil temperature. Comparative observations made of paddy field water and soil temperatures at Taiqian Production Team (high mountain stream bank fields 500 m above sea level) and at Baoshan Production Team (level flatland fields at 230 m above sea level), both in Tonggu County, found little difference in soil and water temperature in still-water paddy fields. The temperature of water running through ditches, however, varied substantially in temperature. In mountain areas, most of the water running through ditches is from the convergence of mountain springs that receive little sunlight, so water temperature is fairly low. If this water goes directly into paddy fields, it will surely lower paddyfield water and soil temperature.

Still another observation was made, this time of the same hill fields, half of which received a lot of sunshine (an average 6 hours daily), the other half receiving little sunshine (getting only ½ hour of sunshine daily because of shading by trees). Average water temperature in the portion receiving much sunshine was 6.8°C higher than in the shaded portion, and average mud temperature was 2.7°C higher. Clearly the cutting down of the shading trees to increase the amount of sunshine, plus proper drainage and irrigation would be an important measure for increasing the temperature of the water and soil in the mountain region paddy field. Insofar as terrain permits, irrigation ditches should carry water over as long a distance as possible in order to help the water temperature rise before it enters paddy fields. In addition, frequent irrigation with small amounts of water and irrigation of fields in turn should be practiced.

Table 4-4. Comparative Observations of Average Temperatures in April

Particulars	Paddy field water temperature	Paddy field mud temperature	Temperature of water in ditches
Guanshan	20.3	19.7	18.7
Taiqian	18.5	18.0	14.5

3. Increased fertilization and soil improvement. Considering the nature of low-yield cold waterlogged fields, soil structure may be improved by mixing in sand or cinders, and by increased fertilization with hot manures such as fire clay ashes to improve water and heat conditions. Skillful fertilization with phosphate fertilizer should be done so that the phosphate increases the nitrate, and lime or gypsum should be mixed in to correct soil pH and to settle suspended soil particles. The soil should be turned in winter for sunning to promote weathering.

4. Merging of hillocks to enlarge fields. The merging of small hillocks into large hillocks makes the land easier to farm and raises the soil reclamation rate, setting the stage for mechanization. Mountain region topography is complex, so it is particularly important to suit general methods to specific circumstances, first merging adjoining field plots that do not differ greatly in elevation, and then expand gradually. The topsoil should not be disturbed so as not to hurt the current year's harvest. As production develops, garden-style farming may be gradually instituted in mountain regions. Where field plots are on overly steep slopes, cultivation should be abandoned allowing the slopes to revert to forests to prevent erosion.

B. Rational Reform of the Farming System

Reform of the farming system is an important measure for full tapping of the potential that soil resources, sunlight and heat can provide to improve the level of agricultural production. The farming system has been fairly undiversified, a single crop of paddy being grown each year for the most part, but with two crops of paddy or a three-crop system of "green manure-paddy-paddy" being used in some places. The growing of two crops of paddy has caught on fairly quickly in recent years, in many counties that are predominantly in mountain areas, the multiple-cropping index has also risen. In Tonggu County, for example, the multiple-cropping index inclusive of green manure is 202 percent. In some places where it was formerly believed two crops of paddy could not be grown, test plantings have succeeded. The Intellectual Youth Team at Liujiaping, which is 710 m above sea level in Jinggangshan, test planted 5 mu of double-crop paddy. Yields from the early crop averaged 301 jin per mu, and yields from the late crop averaged 358.6 jin per mu. The yields from the two crops averaged more than 50 percent more per mu than from a single crop of paddy. However, some places that were erroneously inclined to go ahead with ill-advised expansion of the growing of two crops of rice without regard for specific conditions sustained losses.

Mountain region agricultural production conditions are somewhat complex, with very great variations from one place to another. Reform of the farming system requires the suiting of general methods to specific circumstances and concrete analysis. In addition, mountain region forestry resources are plentiful, and avenues for sideline occupations broad. Fine conditions also exist for development of animal husbandry, so reform of the farming system would definitely help development of economic diversification. The following several general kinds of reform may be applied on the basis of realities in this region:

1. Below 500 m above sea level, wherever water conservancy, fertility and the labor force permits, the growing of two crops of paddy may be increased as appropriate. Analysis of agricultural climate data shows sufficient sunlight and heat in places below 500 m for the growing of two crops of paddy. Study and analysis of data from the Lianhua County meteorology station, for example, shows cumulative temperature required from the time of sowing of early rice to safe heading of the second crop to be as shown in Table 4-5. However, in mountain regions, the number of rainy, overcast days with low temperatures during early spring, the lateness of the final frost, and early arrival of "cold dew winds" are disadvantageous for safe heading of rice in a two-crop system. One must be sure to match varieties properly, and to select varieties that tolerate cold, are early maturing, produce high yields, and are strongly resistant to diseases and insect pests. (See Table 4-6)

Table 4-5. Cumulative Temperature Required From Sowing of Early Rice to Safe Heading of Late Rice

早 a) 稻	b) 早熟			c) 中熟			d) 迟熟		
晚 e) 稻	f) 早	g) 中	h) 迟	f) 早	g) 中	h) 迟	f) 早	g) 中	h) 迟
积 i) 温 (℃)	3750	3950	4150	4040	4200	4400	4300	4500	4700
j) 早稻播种——二晚翻秋齐穗积温(℃)	3350	3550	3750	3600	3800	4000	3900	4100	4300

k) 资料来源：莲花县气象站

Key:
a) Early rice
b) Early maturing
c) Intermediate maturing
d) Late maturing
e) Late rice
f) Early
g) Intermediate
h) Late
i) Cumulative temperature (°C)
j) Cumulative temperature (°C) from sowing of early rice to full heading of late rice in autumn
k) Source of data: Lianhua County Meteorology Station

Table 4-6. Vertical Increments of Cumulative Temperature (80 Percent Certainty)

高 a) 度	10—20℃积温 b)	早稻与一般二 c)晚稻搭配形式	10°—18℃积温 d)	早稻与二晚耐寒 e)品种搭配形式
200米 f)	4477.9	g 迟搭中，中搭迟	4723.2	j) 迟搭迟
300米 f)	4080.5	h 中搭早，早搭中	4412.2	k)迟搭迟，迟搭中
400米 f)	3683.1	i) 早搭早	4101.2	l)迟搭中，迟搭早
500米 f)	3285.7	/	3790.2	m)中搭早，早搭迟
600米 f)	2888.3	/	3479.2	i) 早搭早

n)资料来源：莲花县气象站编《农业气象资料》

Key:
- a) Elevation
- b) Cumulative temperature at 10-20°C
- c) Ways of matching early rice and late rice
- d) Cumulative temperature at 10-18°C
- e) Ways of matching early-rice and cold-tolerant late-rice varieties
- f) Meters
- g) Late matched to intermediate; intermediate matched to late
- h) Intermediate matched to early; early matched to intermediate
- i) Early matched to early
- j) Late matched to late
- k) Late matched to late; late matched to intermediate
- l) Late matched to intermediate; late matched to early
- m) Late matched to early; early matched to intermediate
- n) Source of data: "Agricultural Meteorology Data," Lianhua County Meteorology Station

2. At elevations more than 500 m above sea level, cumulative temperature is very low because of great climatic variations in mountain regions. In addition, since fields are scattered, transportation difficult, the labor force small and sources of fertilizer insufficient, in principle, mostly a single crop of paddy should be grown. Though the amount of heat in mountain regions below 700 m above sea level just meets needs for the growing of two crops of paddy, and though test plantings provide precedents that show the growing of two crops to be possible, nevertheless, practice has shown that in most cases yields from the growing of two crops are no higher than from the growing of a single crop of hybrid. On the contrary, since labor is in short supply, the growing of two crops frequently results in there being too many jobs to handle at once. Concentration on grain while letting forestry and sideline occupations slide is very bad for development of mountain region economic diversification. Therefore, the emphasis in fairly high mountain regions should

be on development of economic diversification and expansion of the growing of two crops of paddy should certainly following the principle of suiting general methods to specific circumstances.

3. Development of some continuous cropping of potatoes and a single crop of hybrid rice. The potato is a crop that likes cold weather, the ideal temperature for its growth being 21°C, and the most suitable temperature for potato formation being 16-18°C. Spring potatoes are generally sown somewhere around 5 February to 19 February. The crop is harvested during May and June, and is followed by the growing of a crop of late paddy. Fall potatoes are usually planted around 23 August, dovetailing with a harvest of the previously grown intermediate-maturing early-rice crop. Development of such a farming system pretty well suits climatic conditions in mountain regions. In addition, potatoes may be used either as a grain or as a vegetable, their stems and leaves being fed to hogs; and they are also an industrial raw material of high cash value. They are readily stored, easily transported, and the masses in mountain regions are accustomed to growing them. Thus, such a farming system is suitable for promotion in mountain regions. When the Fengxin County Mountain Region Institute of Agriculture experimented with this farming system, potato yields reached 3,000-5,000 jin per mu. However, potatoes should not be continuously planted in the same field, both because this makes the spread of epidemic diseases easy and because soil fertility becomes too exhausted. They should be rotated once every 3 to 5 years.

4. Some unirrigated fields that "look to the skies for rain," and mountain stream bank fields where water conservancy facilities are poor are suitable for the growing of dryland grain crops such as corn. A small number of places having requisite conditions may also grow a crop of early paddy as well.

5. Matching up of different kinds of farming systems. The farming system used in mountain regions today is too undiversified, and does not favor the linkinf of soil use to soil nurture. The experiences of numerous advanced units shows that rotation of crops between wetlands and drylands may be done in both a two-crop and a three-crop system for increase in soil fertility. Some people advocate a system of 20 percent rape plus a single crop of late hybrid rice; 20 percent potatoes plus a single crop of late hybrid rice; 40 percent green manure plus a single crop of late hybrid rice, and some fields that lie fallow in winter as a means of crop rotation. In double-crop rice-growing regions having fairly good conditions, the percentage of winter rape and wheat that are grown should be increased. The percentage of the area planted to rape-paddy-paddy should be expanded to around 30 percent. By so doing, both the edible oil problem could be solved and large amounts of dried rapeseed cake would be supplied to solve the problem of fertilizer for the late crop in a two-crop system.

C. Upgrading the Level of Scientific Farming

Despite a substantial rise in the level of farming techniques in mountain regions during recent years, old, traditional and not wholly rational practices persist virtually everywhere. In some communes and brigades, between 20 and 30 percent of all fields are "sanitary fields" that are never manured, and 10 percent of fields are "once cultivated fields" over which an ox, a plow and those transplanting seedlings travel in just a single pass. Old varieties also account for a very large percentage of plantings. Some old varieties account for 58.3 percent of all seeds kept. Clearly, upgrading of the level of scientific farming remains a very arduous task. Emphasis should currently be devoted to the following several matters:

First, selective breeding of superior varieties, promotion of hybrid rice, and good performance in the matching of varieties. In view of the old and heterogeneous state of rice varieties in mountain regions, breeding of high-yield, cold-tolerant varieties suited to mountain regions should be done with all possible speed to become the dominant varieties used. Places that grow a single crop of paddy should promote hybrid rice for spectacular increases in yields. Double-crop rice-growing areas may also promote hybrid rice, and they should also be sure to match varieties. For mountain regions, various kinds of intermediate-maturing early rice are most suitable in order to get as much of a head start as possible during the "double rush" period of harvesting one crop and planting the next.

Second is growing of sturdy seedlings and reasonably close planting. An old saying has it that "good seedlings count for half the standing grain, and sturdy young plants mean high yields." Growing of sturdy seedlings requires, first of all, that sowing not be too dense; one must be willing to leave enough land for the growing of seedlings. The seedling-growing area left should be between 10 and 12 percent of the open-fields area to be planted. In addition, seedling fields require fertile soil that can be irrigated and drained. Before seedlings are grown, base fertilizer must be put down, and followup dressings provided from time to time to promote greening, as a last fertilization prior to transplanting, and for sturdy young plant growth. Second, seeding must be done at the right time to prevent seedling rot and assure the correct seedling age for transplanting. Since water is cold and the number of hours of sunshine short in mountain regions, one must be sure to plant sufficient basic seedlings as well as to promote the use of narrow rows of plants with wide rows between them.

Third is intensification of water management. Water management depends on the kind of paddy grown and on soil conditions, different practices followed for different cases. penerally, early rice requires deep water during its early stage to raise the temperature and promote greening. During midseason, ditches should be dug and the field sunned. In the late season, there should be water for booting and enough water for panicle formation so that grains will be moist and strong. For the late crop of

rice in a two-crop system, deep water is required during the early season. During midseason, the fields should be sunned as required, and during the late season, fields should be moist to promote strong grains. One must guard against cutting off water too early. When cold air currents invade, irrigation with deep water should be done to retain warmth. A certain amount of water should be maintained during the greening stage in cold pasty fields, and dampness should be maintained during the tillering stage. Later on, ditches should be dug and the fields thoroughly sunned. Then, irrigation snould alternate dryness with wetness until full maturity.

Fourth is proper fertilization making full use of mountain region sources of fertilizer to increase the amount of fertilization, and promoting applications of lime, and the use of phosphate fertilizer around seedling roots.

Chapter 5. East Jiangxi Hill and Mountainland Grain, Tea, Forest, and Fruit Farming and Forestry Region

The East Jiangxi hill and mountain agricultural region (termed East Jiangxi region below, for short) includes Jingdezhen City, plus Wuyuan, Dexing, Yushan, Guangfeng, and Shangrao counties, Shangrao City, Hengfeng, Yiyang, and Guixi counties, and Yin-tan City in the Shangrao Administrative Region; Jinxi, plus Zixi, Lichuan, Nancheng, Nanfeng, Chongren, Yihuang, Le'an counties in Fuzhou Administrative Region for a total of 20 administrative units.

This region is located on the eastern border of the province. It is long from north to south and narrow from east to west, and neighbors Anhui, Zhejiang, and Fujian provinces. The area of the region totals 34,600 sq km, or 20.7 percent of the whole province. It has 6.2 million mu of cultivated land of which 5.36 million mu or 86 percent is wetlands. The region's population totals 5,698,000 including 4,736,000 nonagricultural population. Cultivated land averages 1.3 mu per capita of agricultural population.

Hills and mountainlands are widespread throughout this region; climate is warm and moist, and natural conditions are particularly suited to the growing of grain, tea, forests and fruit. Not only does the region have a fine foundation for grain production, but it has also become one of the province's and country's major tea-growing bases, thanks to the arduous reclamation efforts of working people over a long period of time, and particularly vigorous development since liberation. Forest and fruit production also hold important positions in the province. Like the western Jiangxi farm and forest region, this is a farm and forest region with relatively superior agricultural production conditions, and one that hold very great potential for farming, forestry, animal husbandry and sideline occupation production.

First Section. Agricultural Production Conditions

1. Predominantly Hills and Mountains, the Lay of the Land Being High in the East and Low in the West

This region's topography is dominated by hills and mountainlands, the mountainland area is approximately 39 percent of toatl land area, which is somewhat less than in western Jiangxi. Hills account for 53 percent, and the plains area for approximately 8 percent. (See Table 5-1). In the northern, eastern and southern parts of the region are numerous mountains, and in the central part of it are low mountains, hills and river valley plains interspersed with low hills and downlands. Like the western Jiangxi region, the mountains are oriented northeast by southwest as a result of control exercised by geological structure, and they are laid out in a pattern from north to south in the following succession: the Huang Shan branch range, Huaiyu Shan, Wuyi Shan, and Yu Shan. Between mountain ranges lie broad synclinal valleys. The orographical pattern is similar to that of the western Jiangxi region, but the lay

of the land is high in the east and low in the west, just the reverse of the western Jiangxi region. The Wuyi Range is the principal mountain range in this region. At the northern end, it wanders along the Jiangxi-Fujian border through Nanfeng, Lichuan, Zixi, Guixi, Yanshan, Shangrao, and Guangfeng counties in the region, and through Jianning, Shaowu, Guangze, and Chong'an counties in Fujian Provin-e. It is at an elevation of 1,000 to 1,500 m above sea level, and its highest peak, Huanggang Shan, towers over the border between Yanshan County and Chong'an county. The Wuyi Range has a towering topography through which run the famed Yanshan Divide Pass and the Lishanyu Pass, which have been major transportation routes between Jiangxi and Fujian provinces since ancient times. The Huaiyu Range extends from the border between Jiangxi and Fujian into the middle of this region and is the watershed range separating the Xin River from the Le'an River. The relief is relatively low at approximately 500 m. The Huangshan branch range in the north extends from southern Anhui into Wuyuan and Jingdezhen in this region. It is the watershed range between the Le'an River and the Chang River. Its highest peak, Wugujian, is at an elevation of 1,618.4 m above sea level. The Yu Shan complementary dyke spreads into Yihuang, and Le'an counties in the southern part of the region and forms the watershed range between the Fu River and the Gan River. It also is not very high above sea level at mostly 600 to 700 m, with a few peaks at more than 1,000 m. Tea, fruit, timber, bamboo, and medicinal herb resources are found widely throughout the broad mountainlands and hills.

Among the low mountains and hills are mountain basins and river valley plains of varying size. Together with the region's low hills and downlands, they form the principal cultivated land area. Farming in low hill and downland areas is prone to drought. The percentage of low-yield red earth type fields is fairly large, and these fields as well as the "three running fields" and "cold pasty fields" found scattered in mountain regions require active measures for vigorous improvement.

Like the western Jiangxi farm and forest region, this region has many types of farming landscapes. Since the mountain and hill area is large, the cultivation and reclamation index for land utilization in this region is fairly low (12 percent), and the region is characterized by a large tea, forest and fruit area (amounting to 40 percent of the land area). Conditions are extremely superior and potential is very great for further development of economic diversification and all-round development of farming, forestry, animal husbandry and sideline occupation production.

2. Complex Distribution of Heat and Particularly Copious Precipitation

This region is narrow from north to south, crossing approximately 3.2 degrees of latitude. It is basically a part of the unbroken chain of mountains and hills within the region including the Huaiyu Shan, Wuyi Shan and Yu Shan mountain ranges. Climatic characteristics are similar to those of the western Jiangxi agricultural region, but temperatures are a li.tle higher and there is more precipitation. (See Table 5-2).

Table 5-1.

Statistical Table For Landform Categories in All Counties of the Eastern Jiangxi Agricultural Region

县、市 a)	土地面积 b) (平方公里)	山 c) 地		丘 d) 陵				e) 平原（包括水面和部分岗地）	
		面 f) 积	占土地面积% g)	高丘面积 h)	占土地面积% g)	低丘面积 i)	占土地面积% g)	面 f) 积	占土地面积% g)
j) 全区合计	34571.0	13407.0	38.8	7423.8	21.5	10765.2	31.1	2975.0	8.6
k) 北部副区	8070.0	3069.0	38.0	2620.2	32.5	2267.8	28.1	113.0	1.4
l) 景德镇市	3025.0	908.0	30.0	1119.5	37.0	967.5	32.0	30.0	1.0
m) 婺源	2964.0	1245.0	42.0	831.7	28.1	887.3	30.0	/	/
n) 德兴	2081.0	916.0	44.0	669.0	32.1	413.0	19.8	83.0	4.0
o) 东部副区	5663.0	2927.0	51.7	737.0	13.0	1972.0	34.8	27.0	0.5
p) 玉山	1727.0	1036.0	60.0	120.4	7.0	570.6	33.0	/	/
q) 广丰	1368.0	561.0	41.0	325.0	23.8	482.0	35.2	/	/
r) 上饶	2568.0	1330.0	51.8	291.6	11.4	919.4	35.8	27.0	1.1
s) 中部副区	7017.0	2727.0	38.9	1241.0	17.7	1478.0	21.1	1571.0	22.4
t) 铅山	2164.0	1298.0	60.0	419.4	19.4	403.6	18.7	43.0	2.0
u) 横峰	651.0	208.0	32.0	141.2	21.7	281.8	43.3	20.0	3.1
v) 弋阳	1581.0	427.0	27.0	414.6	26.2	217.4	13.8	522.0	33.0
w) 贵溪	2481.0	794.0	32.0	265.8	10.7	575.2	23.2	846.0	34.1
x) 鹰潭	140.0	/	/	/	/	/	/	140.0	100.0
y) 南部副区	13821.0	4684.0	34.0	2825.6	20.4	5047.4	36.5	1264.0	9.1
z) 金溪	1358.0	95.0	7.0	288.9	21.3	526.1	38.7	448.0	33.0
aa) 资溪	1248.0	861.0	69.0	341.2	27.3	45.8	3.7	/	/
ab) 黎川	1731.0	554.0	32.0	469.3	27.1	690.7	39.9	17.0	1.0
ac) 南城	1698.0	391.0	23.0	466.0	27.4	603.0	35.5	238.0	14.0
ad) 南丰	1909.0	592.0	31.0	322.9	16.9	994.1	52.1	/	/
ae) 崇仁	1520.0	127.0	8.4	327.4	21.5	523.6	34.4	542.0	35.7
af) 宜黄	1944.0	1147.0	59.0	364.2	18.7	413.8	21.3	19.0	1.0
ag) 乐安	2413.0	917.0	38.0	245.7	10.2	1250.3	51.8	/	/

ah) 注：上饶包括上饶县和上饶市

[Key for table on previous page]

Key: a) County or city
b) Land area (sq km)
c) Mountainlands
d) Hills
e) Plains (including water surfaces and some downlands)
f) Area
g) Percentage of land area
h) High hill area
i) Low hill area
j) Total for whole region
k) Northern subregion
l) Jingdezhen City
m) Wuxian
n) Dexing
o) Eastern subregion
p) Yushan
q) Guangfeng
r) Shangrao
s) Central subregion
t) Yanshan
u) Hengfeng
v) Yiyang
w) Guixi
x) Yingtan
y) Southern subregion
z) Jinxi
aa) Zixi
ab) Lichuan
ac) Nancheng
ad) Nanfeng
ae) Chongren
af) Yihuang
ag) Le'an
ah) Note: Shangrao includes both Shangrao County and Shangrao City.

Sunshine conditions: This region has abundant sunlight, more in the north than in the south, and more on the plains than in mountain areas. Annual sunlight averages approximately 1,649-2,009 hours, between 37 and 46 percent of all days being sunshiny. However, there is much fog and little sunshine in mountain areas. For example the "Wulu green tea" produced in Wuyuan County is produced under climatic conditions of strong radiation, little sunshine, high moisture and low temperatures. Tea quality is fine and flavor is mellow. Thus, this region's mountain regions make fine bases for development of tea production.

Table 5-2. Statistical Data on Climate For Representative Counties in the Eastern Jiangxi Agricultural Region

Units: C, Millimeters, Hours, Days

表 5—2

单位：℃，毫米，小时，天

代表县 a)	b) 平均气温			c) 极端气温		d) 10℃积温			e) 年平均降水量	f) 日照时数	g) 无霜期
	h) 年温	i) 一月	j) 七月	k) 最高	l) 最低	m) 初日	n) 终日	o) 积温			
p) 婺源	16.7	4.4	27.9	41.0	−11.0	25/3	16/11	5227	1828	1860	251
q) 景德镇	17.1	4.5	28.6	41.8	−10.9	23/3	18/11	5388	1687	2009	247
r) 德兴	17.2	4.7	28.6	40.7	−10.6	20/3	19/11	5454	1870	1943	255
s) 玉山	17.5	5.2	29.0	43.3	−8.9	21/3	25/11	5574	1818	1977	256
t) 广丰	17.9	5.5	29.4	40.5	−9.1	22/3	26/11	5687	1649	1877	264
u) 贵溪	18.2	5.8	29.8	41.0	−7.5	19/3	26/11	5805	1791	1988	273
v) 资溪	17.0	5.0	27.6	39.5	−11.1	24/3	19/11	5288	1934	1649	279
w) 南城	17.8	5.6	28.9	41.5	−7.8	22/3	24/11	5616	1604	1799	276
x) 乐安	17.1	4.7	28.3	39.5	−9.8	26/3	18/11	5299	1658	1736	262

Key:
a) Representative counties
b) Average annual temperature
c) Extreme temperatures
d) Temperature stabilized at 10°C or above
e) Annual average amount of precipitation
f) Number of hours of sunshine
g) Forst-free period
h) Average annual temperature
i) January
j) July
k) Maximum
l) Minimum
m) First day
n) Last day
o) Cumulative temperature
p) Wuyuan
q) Jingdezhen
r) Dexing
s) Yushan
t) Guangfeng
u) Guixi
v) Zixi
w) Nancheng
x) Le'an

Heat conditions: This region's annual temperature averages 16.7-18.2°C. January is the coldest month with temperature averaging 4.405.8°C. July is the hottest month with temperature averaging 27.6-29.8°C. The trend of temperature patterns is low in north and south and high in the central part of the region, i.e., temperature is fairly high from Yingtan to Shangrao, higher by approximately 0.6-1.9°C than the average annual temperature in other agricultural regions at the same latitude. Thus, it is said that this is the place in the region with the most plentiful heat conditions. However, in mountain regions such as Wuyuan, Zixi, Le'an and Yihuang counties, heat is somewhat lacking. During winter, minimum temperature in this region ranges from -7.5°C to -11.1°C, while maximum annual temperature is 39.5°-43.3°C.

This region has from 237 to 254 days when average temperature is stabilized at 10°C or higher, and cumulative temperature reaches 5,227° to 5,805°C during this period, a difference of approximately 580°C. This shows a fairly considerable variation in heat distribution from one place to another. Consequently, the farming system must make sure to suit general mthods to local conditions in matching varieties and in the use of planting techniques, shunning "arbitrary uniformity" in order to avoid unnecessary losses.

Moisture conditions: This region receives an average 1,604-1,934 mm of rainfall annually, making it the place in the province receiving the largest amount of rainfall. Zixi County is the province champion in the amount of precipitation. Intermittent drizzle is conspicuous during May and June when precipitation is fairly concentrated, and torrential typhoon rains also occur. During summer, a fair number of thunder showers also occur in mountain regions. As a result, moisture is fairly plentiful in this region, however, in some years autumn drought is also fairly common, so impounding of water to guard against drought is a concern.

This region's agricultural climate resources are relatively superior, however, varying degrees of low temperatures occur annually as well, and the region also has flood, waterlogging, and drought disasters.

Spring cold: In this region, the first day when average daily temperature stabilizes at 10°C occurs between 19 and 26 March. This happens fairly late in Le'an and Yihuang, which are mountain region counties. As a result, this area begins spring sowing a week later than plains areas. In years of serious spring cold, the difference is even greater. For example, in 1965, Le'an had a month of low temperatures with overcast and rainy weather from mid-March to mid-April; more than 300,000 jin of seeds rotted. Yiyang had 28 consecutive days of low temperatures with overcast and rainy weather from late March to mid-April, and seedling rot was serious.

Flooding and waterlogging: Flooding and waterlogging occur during May and June in this region. Fairly serious flooding and waterlogging occurred during 1952, 1954, 1955, 1962, 1969 and 1970. In some years, typhoons can also bring on mountain torrents. Such was the case with a typhoon in August 1953 that unleashed mountain torrents that caused very great damage in the Xin River basin. In some years the spring flood season comes early, and this may also unleash mountain torrents. In February 1959, for example, 404 mm of rain fell in Zixi County during the month and some farmland in the lower reaches of the Fu River was drowned.

Drought: Midautumn drought occurred in this region during 1951, 1953, 1956, 1958, 1963, 1967 and 1971, the worst one in 1963. In some places, no soaking rain fell for more than 100 days and 100,000 mu of farmland became a disaster area. The second most serious midautumn drought was in 1971 when, for example, total rainfall in Nancheng County over a 71-day period was only 8 mm, and the Hongmen Reservoir nearly dried up.

Low autumn temperatures: The average time of occurrence of low autumn temperatures in this region is between 26 September and 7 October, and usually they come earlier in the northern part of the mountain regions. As a result of low autumn temperatures in 1965, Yushan County had a 30 to 40 percent empty-glume rate for its second rice crop. As a result of low autumn temperatures during 1967 and 1969, late crop planted in Qianshan County after "Autumn Begins" [around August 7-21] produced virtually no grain at all.

3. Large Volume of Rapidly Flowing Water in Rivers, and Fairly Rapid Development of Water Conservancy Projects

This region's rivers are part of the Boyang Lake system. Since they are controlled by the terrain, most rivers rise around the northern, eastern and southern edges of the region and flow through it to enter Boyang Lake. The Chang and Le'an rivers are the main rivers in the northern part of the region. They flow southwestward across Wuyuan and Dexing counties. The area through which these two rivers flow is mostly a metamorphic rock mountain region, and there are many shoals in the river that hamper navigation. Water and soil have been well conserved in this river basin; the river bed is stable; the amount of sand carried in rivers is miniscule, and silting is not conspicuous.

The Xin River (also known as the Shangrao River) is the main river in the central part of this region. In its upper reaches, the Yushan River and the Fengqi River, which rise in the Huaiyu Shan and the Shanxia Range on the Jiangxi-Zhejiang border flow from east to west across Yushan, Shangrao, Qianshan, Yiyang and Guixi counties. Fairly large tributaries include the Fengqi and Qianshan rivers. In the southern part of the basin lies Wuyi Shan, and to the northeast lies Huaiyu Shan. Low hills composed of red sandstone and conglomerate line both shores of the main stream. The riverbed gradient is gentle and interspersed with sandbars.

The Fu River, which is also known as the Xu River, is the main river in the southern part of this region. It rises to the south of the county seat of Guangchang County in the western foothills of the Wuyi Shan, and flows from south to north through Nanfeng, Nancheng and Linchuan counties to Nanchang County where it joins with the Gan River. The Litan, Yihuang and Chongren rivers are its tributaries. Along the upper reaches of from its source to Nancheng, the Fu River flows through fairly well-weathered sandstone hill region with little ground cover, so the riverbed has risen from silting and has spread out. It contains many sandy shoals. Below Nancheng, it flows through a region in which red sandstone hills alternate with alluvial plains. The river valley is broad, and the river bed is not stable.

The foregoing shows that most of the rivers in this region are in the nature of headwaters with a steep slope and a rapid flow. Because of the copious rainfall, the mountain region forest cover rate is high, and though the river basin area is not large, the volume of water is substantial, containing plentiful water conservancy and waterpower resources. Moreover, seasonal volume of flow varies considerably, reaching a maximum during May and June and a minimum during December and January. During the spring and summer flood season, the volume of flow amounts to between 70 and 80 percent of total volume for the whole year. This region is also the center for torrential rains in the province, and rivers rise and fall tempestuously. Despite the fairly steep gradient of river beds that drains away water, the flood threat is still fairly serious. Up until the time of liberation, this region has extremely few water conservancy facilities. Nine out of every 10 years were drought years for most of the cultivated land in mountain regions, yet flood disasters would frequently occur on cultivated land along rivers, and agricultural production levels were very low.

Following liberation, large-scale farmland capital construction centering around the harnessing of waters and soil improvement was undertaken on the basis of this region's natural conditions, and great accomplishments were scored. During the past 30 years, 10,000 water conservancy projects have been either completed or substantially completed throughout this region. Renowned large reservoirs with a storage capacity of more than 100 million m^3 include the Hongmen Reservoir in Nancheng County, and the Qiyi Reservoir in Yushan County. Approximately 30 medium reservoirs with a capacity of fewer than 100 million m^3 but more than 10 million m^3 have been built. These, plus countless small reservoirs and mountain pools, as well as all sorts of projects for lifting and diverting water have meant steady expansion of the irrigated area. Today, the effectively irrigated area of most of the counties in this region extends to between 70 and 80 percent of the cultivated land area. It even reaches a more than 90 percent maximum (as in Nancheng and Wuyuan counties), which is more than the average for the province as a whole. Wetlands capable of delivering consistently high yields despite flood or drought have increased gradually. In 1979, the consistently high yield farmland area stood at 185 mu [sic], which was approximately 29.8 percent of the total cultivated land area. This region is one of those in the

province that has achieved tremendous results from the use of the mountain region's plentiful waterpower resources for vigorous development of small-scale hydropower. In addition to the fairly large power stations existing in each province today, most counties have several tens of small commune- and brigade-operated hydropower stations, and some have more than 100 (Wuyuan, Jingdezhen, Nanfeng, Yihuang, and LIchuan among them). Small-scale hydropower stations that have already come on stream in Yushan, Shangrao and Wuyuan counties have an installed capacity of more than 10,000 kW.

Distribution of this region's water conservancy and irrigation facilities remains unbalanced, and some projects have not been fully equipped. They are not truly able to make use of their designed capacity, and the level of equitable use and scientific use of water is not high. Furthermore, yields from some fields are either inconsistent or consistently low, or even neither consistent nor high. They are in a situation of "major reductions in yields during major disasters, small reductions in yields during minor disasters, and slight increases in yields when the weather is just right." They are still a substantial distance from a genuine solution of the root causes for drought and flood disasters and from fundamental improvement of farmland water conservancy conditions. Future efforts at harnessing waters will have to be done in coordination with the northern Jiangxi agricultural region, and across-the-board consideration given to formulation of plans for each river basin. A policy of "taking storage of water as the key link" will have to continue to be carried out with construction of more mountain pools and reservoirs in order to eradicate drought and flood damage in the region. This will simultaneously reduce and eradicate the flood and waterlogging threat in the lower reaches of the northern Jiangxi agricultural region.

4. Socioeconomic Conditions

A. Plentiful But Unevenly Distributed Labor Force and Insufficient Animal Power Requiring Development

This region was an old revolutionary base during the second internal revolutionary war. As a result of extremely cruel encirclement and suppression at the hands of the Kuomintang reactionary clique, the population of numerous counties declined dramatically.[1] Following liberation with development of industrial and agricultural production as well as improvement in medical and health conditions, the natural rate of population increase rose greatly, and a great increase also occurred

1 For example, during the second internal revolutionary war period, it was Hengfeng County, the location of the Fujian-Zhejiang-Jiangxi Provincial CCP Committee and soviet government. During the soviet region period, population increased to more than 100,000, but by 1949 it was only 60,000, a decline of more than 40 percent.

in the number of immigrants to the region.[2] As a result, population increased rapidly, and in 1979, the region's population was more than twice what it had been in1950. Thus, work force resources were extremely plentiful, with each member of the region's agricultural work force servicing an average 3.68 mu of cultivated land. This was about the same as in the western Jiangxi region, and less than the average for the province as a whole. This was advantageous for development of the region's agricultural production. However, as a result of natural conditions and the effects of historical factors, the region's population is unevenly distributed. In some places population is large relative to the amount of farmland as, for example, in Guangfeng County with an agricultural population of 550,000 and a cultivated land area of slightly more than 340,000 mu, an average of only 0.6 mu per capita of agricultural population. The county has a work force numbering more than 140,000, so each member serves only approximately 2.5 mu of cultivated land. In some counties in the southern part of this region, however, population is small relative to farmland as, for example, in Zixi County. This county has a work force of approximately 23,000, each member of which serves an average of 7 mu of cultivated land and also cares for more than 70 mu of mountain forests. The burden on the work force is very heavy. Because this region's economic forest (tea) area is large, the overall burden on the work force in most counties throughout the region is fairly heavy. This is particularly true during the very busy season each spring when plowing and transplanting must be done, which is also just the time for the felling of timber, the cutting of bamboo, the drying of bamboo shoots and the picking of tea. The fall season when bamboo is cut, tea is picked and acorns are collected also coincides with the busy season of fall harvesting and planting. During winter when mountain afforestation is done, large-scale farmland capital construction and road building must also be done and the shortage of labor becomes even more apparent. How to allocate in an equitable way work forces required for farming, forestry, animal husbandry and sideline occupations in the fact of this work force situation in the region, and how to reform the farming system and render a good performance in planning crop succession for the whole year are problems requiring satisfactory solution for further development of this region's agricultural production. This region has 238,000 plow oxen, each of which serves more than 26 mu of cultivated land. This is the largest burden in any of the province's agricultural regions, and it is a problem that awaits vigorous development.

B. Relative Increase in Quantities of Chemical Fertilizer Used; Fairly Slow Development of Agricultural Mechanization

According to 1979 statistics, this is one of the region's in the province that uses a fairly high amount of chemical fertilizer per unit of area. At 82.3 jin per mu, the figure is higher than the average for

2 Statistics from authorities concerned show a total of more than 63,000 immigrants as having been settled in this region from the Xinan and Fuchun river reservoirs in Zhejiang Province alone after liberation. A considerable number also immigrated to this region from Fujian and Zhejiang provinces on their own volition.

the province as a whole. Without doubt, this is a favorable circumstance for development of the region's agricultural production. Ziyuan County has fairly plentiful minerals for the manufacture of fertilizer. The large fault area of northeastern Jiangxi that runs from Wuyuan to Yiyang, most of which is ultrabasic rock, is the area of the province's greatest reserves of serpentine, olivine and talc, and Zixi County has very large reserves of potash feldspar. All these minerals are important raw materials for making calcium magnesium phosphate fertilizer. In addition, Shangrao, Yushan, and Guangfeng counties have substantial deposits of phosphate; pyrite and limestone are found over wide areas of Dexing and other counties. Full use of the region's plentiful mineral resources for making fertilizer, vigorous development of the chemical fertilizer industry, and further increase in the amount of chemical fertilizer used, is an extremely important task. Mechanization of agriculture has developed fairly slowly in this region. In 1978, the region's machine-plowed area amounted to only 20.8 percent of the total cultivated land area. This was lower than for all the other agricultural regions of the province with the sole exception of the southern Jiangxi agricultural region. Even in Shangrao City, Jingdezhen City, and Nancheng County, where the level of mechanization is fairly high, the machine-plowed area is no more than about 30 percent. In many counties such as Shangrao, Qianshan, Guangfeng, and Guixi, it is less than 12 percent. Clearly agricultural mechanization is a weak link in this region's change of conditions for agricultural production.

Second Section. Current Status and Characteristics of Agriculture, and Variations Within the Region

1. Current Status and Characteristics

This region's environment and socioeconomic conditions both have much in common with and also differ markedly from those of the western Jiangxi agricultural region. This is reflected in the structure and development of the agricultural sector and in regional patterns, which have the following overall features:

A. Farming Industry Devoted Primarily to Grain Production With a Small Percentage of Cash Crops

Grain production is the major production sector of this region's farming industry. In 1979, 9.52 million mu, or more than 66.8 percent of the total area sown to farm crops, was sown to grain crops. Paddy rice holds a prominent position among grain crops, 91.8 percent of the total area sown to grain having been sown to paddy rice. Wheat, sweet potatoes, miscellaneous grains other than rice and wheat and soybeans make up a very small percentage.

Before liberation and during the period immediately following liberation, this region grew mostly a single crop of paddy, namely, early paddy, intermediate paddy, or late paddy. Yields averaged no more than 200 to 300 jin per mu. Since water conservancy facilities were very poor,

intermediate rice was frequently threatened by midautumn drought; by contrast, a harvest from the early rice crop was more dependable. As a result, the growing area for early rice gradually increased. But once the early paddy had been harvested, a crop of late autumn crops was rush-planted. As a result, the area planted to buckwheat (for yields averaging approximately 40 jin per mu) expanded for a time. Subsequently, as a result of measures such as a "change to early rice from intermediate rice," "a change to two crops from a single crop," and "a change to short stems from tall stems" grain yields increased steadily. In 1979 the whole region's grain output totaled 4.68 billion jin, a 2.4-fold increase over the 1.38 billion jin output of 1949. Yields per unit of area also rose greatly. In 1978, yields averaged 864 jin per mu figured in terms of the grain field area, second only to those of the western Jiangxi region for second place in the province. If figured in terms of 988 jin of grain per capita of agricultural population, this was higher than the average for the province as a whole. Production was very uneven among the counties and cities within the region, with speed of growth being fairly rapid in Nanfeng, Nancheng, Zixi, and Yushan counties. By contrast, speed of growth in Jingdezhen, Le'an, and Chongren counties was fairly slow. Grain yields per mu and average per capita yields varied even more greatly. Though both gross output and yields per mu of grain were fairly high in some counties, they were very low in terms of average grain per capita. This was particularly so in counties like Guangfeng County with a large population relative to fields where yields averaged 1,200 jin per mu in 1979, the highest for any county in the whole region. However, the average in terms of agricultural population was only 622 jin of grain per capita, the lowest for any county in the whole region, and one of the lowest for any county in the whole province. The uneven development of grain production signifies existence of a fairly great potential for increased yields.

The growing area for cash crops in this region is proportionally fairly small. In 1979, the growing area for cash crops was 715,000 mu, which was only 5 percent of the total area in the region sown to farm crops, making this the smallest growing area for cash crops in the whole province. Moreover, this also represents a substantial decline from the 1950's. The rape area is largest, accounting for 64 percent of the area sown to cash crops. Jute, cotton, sugarcane, tobacco, sesame and peanuts are also grown, however, except for tobacco in Guangfeng County and sugarcane in Yushan County, most areas are relatively small. They are of no importance in the province as a whole and of no significance as producers of marketable products.

Rape is the most common oil-bearing crop grown in this region. In 1979, 460,000 mu were sown to it for a gross output of 280,000 dan of rapeseed, an average 61 jin per mu, which is about the average for the province as a whole. In future, simultaneous with major efforts to increase yields per unit of area should be full use of some fields that currently lie fallow during winter for active expansion of the rape-growing area and increase in rapeseed output.

This region's tobacco is sun-dried tobacco for the most part. In 1979, 13,000 mu of it, or 23.4 percent of the total for the whole province, was grown, making the region second in the province after the southern Jiangxi region. Two-thirds of the growing is concentrated in Guangfeng and Lichuan counties. This tobacco enjoys a certain reputation in China as "old purplish red" from Guangfeng, and "shredded tobacco" from Lichuan. During the past more than 10 years, there has been a substantial decline in both growing area and output, and the decline has been even greater when compared with the all-time high.[3] Urgent action will have to be taken for vigorous renewal and development. A fair amount of jute was grown in the period immediately following liberation, but a dramatic decline has taken place in recent years. Still, the region has the second highest output in the province. In 1979, output was 70,000 dan, most of it from Guangfeng and Shangrao counties. A firm grip will have to be taken on implementation of the planned growing area, and vigorous efforts made to increase yields per unit of area. The cotton-growing area is small and output low. Mostly it is grown in Chongren, Nancheng, Yushan, and Shangrao counties, each of which grows more than 10,000 mu. Cotton production should be better concentrated in the future, and vigorous efforts made to increase yields per unit of area. Sugarcane growing holds a definite position throughout the province. In 1979, it was grown on a 32,500 mu area throughout the region, and gross output was 1.65 million dan for second place in the province. More than half of it was grown in Yushan County, which is one of the key sugarcane-producing counties in the province in which mechanized cane-crushing predominates. In addition, Guangfeng also produces a substantial amount of cane that is crushed by indigenous methods. Future emphasis should be primarily on increase in yields per unit of area accompanied by improvement in varieties to improve the sugar content of sugarcane.

B. One of the Major Tea, Forest, and Fruit Bases in the Province

This region has a vast mountainland and hill region in which forest resources abound. This region, together with the southern and western Jiangxi regions, are major timber and bamboo bases in the province. The region has a forest area of more than 20 million mu, and 71.24 million m^3 of living timber reserves, which is more than one-fourth the total for the whole province. In 1979, more than 600,000 m^3 was felled. This was more than one-fifth the total for the whole province. It provided the state with more than 500,000 m^3 of marketable timber for powerful assistance to the country's building of socialism.

Distribution of the region's forest resources may be roughly divided in terms of different geographic location as follows: (1) the Huaiyu Shan-Huang Shan branch range forest region that includes mostly Wuyuan and Dexing counties, plus Jingdezhen City, and in which deciduous trees and masson pines predominate; (2) the Wuyi Shan forest region, which

3 According to data from the 1036 "Jiangxi Yearbook," Jiangxi'a 1917 tobacco output was 1,989,825 dan, making it the country's foremost tobacco-producing area. In 1933, output was 266,374 dan. That year, Guangfeng County alone produced 85,000 dan on an area of 114,000 for first place in the province.

includes mostly Lichuan, Zixi, Nanfeng, Qianshan, and Guixi counties, and in which masson pine predominates, deciduous trees being second; (3) the Dawang Shan forest region, which includes mostly Le'an, Yihuang and Chongren counties, with masson pine and China fir being the principal trees.

Because of the reckless cutting and denudation by Kuomintang reactionaries prior to liberation, this region's forest area became increasingly smaller; erosion became worse and worse, and the wasteland area increased steadily. Following liberation, a very great change took place in forestry production. In 1979, 40 percent of the total land area of the region was forested. This was higher than the average for the province as a whole, and Le'an, Nancheng and Wuyuan counties emerged as advanced counties in forestry production.

In addition to its timber forest area, this region has a fairly large tea oil area amounting to 2.29 million mu or approximately 17 percent of the province's total growing area for tea oil. Hengfeng, Shangrao and Yushan are major producing areas for tea oil in the province.

This region is a red earth hill and mountain region with a warm and moist climate suited to the growing of tea. It has always been a major tea-producing base for the province, and occupies an important position nationally as well. Wuyuan's "Wulu green," Jingdezhen's "Jinghong black," and Shangrao's "Raolu green" are teas of superb quality renowned in tea markets in China and abroad. In 1979, the region's gross tea output reached 102,600 dan, 55.8 percent of the whole province's total tea output. Seven of the province's 22 major tea-producing counties and cities are found in this region, namely, Wuyuan County, Jingdezhen City, Shangrao, Qianshan, Dexing, Yushan and Guangfeng counties. Tea output from these places amounted to 95,900 dan, which was more than 60 percent of the gross output of key tea-growing counties in the province. In 1976, Wuyuan County produced more than 50,000 dan to become one of the 18 counties in the country with an annual output of 50,000 dan of tea. Since liberation, this region's tea plantation area has grown greatly, amounting to 375,00 mu in 1979 and spread over a wide area of the north and east in Wuyuan, Jingdezhen, Shangrao, Qianshan, Dexing, Yushan, Guixi, Guangfeng and Yiyang. The tea plantation area in the region's southern counties was not very large in the past. In recent years, however, it has grown rapidly, and new tea plantations have come into production one after another for a great increase in output. The tea plantation area of Jinxi County, for example, already amounted to 12,000 mu in 1978, and output was more than 2,200 dan.

Tangerines and oranges are yet another specialty of this region. Nanfeng's honey oranges are acclaimed as the "king of oranges" and are known in China and abroad. They have been grown for more than 1,100 years.[4] The kumquats produced by Huwan in Jinxi County are also very farmous, most

4 Quoted from "Preliminary Research on the History of Honey Orange Growing in Nanfeng," an article in "Jiangxi Tangerine and Orange Science and Technology Bulletin," Second Quarter, 1979.

of them being locally processed into cookies and marketed inside and outside the province. This region's production of oranges and tangerines has grown very rapidly since liberation. In 1979, the region had 46,400 mu of orange grove area and an annual output of 144,000 dan of oranges and tangerines, 22 percent of the total for the province as a whole. Most of these were grown in the region's southern counties including Nanfeng County which produced 80 percent of the whole region's output of tangerines and oranges, or 114,600 dan. Most of these were grown on the alluvial soil of the Fu River plain. In recent years, Nancheng, Jinxi, Chongren, and Le'an counties, as well as numerous counties in the northern part of the region have used hills and mountainlands to promote the growing of Wenzhou honey oranges, and they have been very successful in this. As new orange groves enter production, considerable growth will occur in this region's output of tangerines and oranges. It should be pointed out, however, that this region's tangerine and orange yields per unit of areas are still not high. In 1979, yields averaged 309 jin per mu, which was slightly lower than the 313 jin per mu average for the province as a whole. A great potential remains to be tapped. In the future, except for a few areas that can select wasteland slopes having conditions suited to expansion of the tangerine and orange growing area (such as Guixi and Qianshan counties where warmth conditions are superior, notably in winter where, as a result of the blocking of mountain ranges such as the Huaiyu Shan, wind force is relatively small with most winds being from the east so that tangerines and oranges are not prone to freeze damage, and where there are many wasteland hill slopes that can be gradually built up into production bases for marketable oranges and tangerines), most places will have to devote major efforts to increasing yields per unit of area and to production of quality tangerines and oranges. It will be necessary to give serious attention to soil improvement and harnessing of water, increasing sources of fertilizer, increasing fertilization, and improvement in conditions for the production of oranges and tangerines. Actions will have to be taken to guard against summer and autumn drought and winter freezes (particularly in northern counties). Scientific care and intensive cultivation will have to be instituted to insure high yields. Prevention and control of diseases and insect pests will also have to be intensified to improve fruit quality. The 10 besides, includijg paths between fields, areas alongside ditches, and pondside areas should be used for the growing of tangerines and oranges. This will both make full use of the land and will also partially solve, in communes and brigades having a large population relative to fields, the problem of competition for land between grain and citrus fruit. Not only does this region produce oranges and tangerines, but a certain amount of pears and peaches as well, the growing of which is done everywhere, principally in the northern counties. The provincially administered Taqiao Horticultural Farm located in Guixi County is a major base in the province for production of pears and peaches.

C. Fairly Slow Growth of the Fish Breeding Industry and Animal Husbandry, Levels of Production Awaiting Further Improvement

This region's fishing industry production relies mostly on breeding in reservoirs, ponds and pools. Since liberation, and particularly since 1958, with rapid development of water conservancy projects, steady in;rease in the water surface area of reservoirs and mountain pools has come about. This has provided favorable conditions for development of the fish breeding industry. In 1978, the region had 269,000 mu of fish breeding area. In addition to the two large reservoirs, Hongmen and Qiyi, the region also had as many as 100 medium and small reservoirs covering an area of more than 100 mu found in each of its counties. In 1979, the region produced 166,700 dan of aquatic products, more than 70 percent of which had been bred. Yields were higher than the average for the province as a whole. The largest breeding areas were in Guixi, Chongren, Nancheng, Shangrao, Yushan and Guangfeng counties, and these counties also produced the largest output of fish. However, as compared with advanced units elsewhere inside and outside the province, this region's fishing industry output is not high, and a very great potential exists. Future actions must be taken, and full use made of water surfaces for development of fish breeding. Fish must be reared scientifically and every effort made to increase yields per unit of area. Chaetodontoplus septentrionalis and red carp from Wuyuan, which are famed inside and outside the province should be emphasized for rearing and spread.

This region has a fairly good foundation for animal husbandry production. In 1979, the region had 1,749,000 live hogs in inventory, or an average of 0.29 head per mu of cultivated land. Though this was slightly higher than the average for the province as a whole, it was lower than that of the western Jiangxi agricultural region. The level of development of cattle has been fairly low. In 1979, the region had a total of 320,000 plow oxen, which was 15.3 percent of the total number of plow oxen in the province, and about the same number as in the western Jiangxi agricultural region. Animal husbandry production is very unevenly distributed within the region. Hog raising has developed more rapidly than elsewhere in Lichuan, Nancheng, Dexing, Guangfeng and Jingdezhen. Production levels for cattle rising are higher than elsewhere in Yiyang, Guixi, Jinxi, Le'an, and Yihuang counties.

Natural conditions in this region are complex. The hill and mountainland area is vast and grassy mountains and grassy hillsides are numerous, providing a fairly good basis for a farming industry that grows mostly grain. Animal husbandry production has a long history, and numerous different superior local breeds have come into being over a long period of time. These include the mottled hogs (of which the "golden sand hog" from Guixi County is famous) from Wuyuan, Dexing and Guixi counties in northeastern Jiangxi; black hogs (of which "Xing'an hogs" from Hengfeng, "Fengu hogs" from Guangfeng, and black hogs from Yushan are famous) from Hengfeng, Yushan and Shangrao counties in northeastern Jiangxi; black hogs from Zixi, Lichuan, Nancheng and Nanfeng counties in eastern Jiangxi, plus Fuzhou mottled hogs (of which Chongren "Qiuqi hogs" are fairly famous) from Jinxi, Chongren and Yihuang counties. When raised locally, these breeds demonstrate wide adaptability, quick weight gain, and fine-quality flesh. Northeastern Jiangxi yellow oxen are the dominant

plow oxen. Northeastern Jiangxi yellow oxen that are produced in the area centering around Guangfeng have the largest bodies of any oxen in the province and are able to do a large amount of work. In addition, Guangfeng goats are very well known in the province. Making full use of this region's advantageous conditions for vigorous development of animal husbandry production, particularly revival and development of grazing cattle and goat production is a major task. Numerous grassy mountains and hillsides may be used in this region. Counties and communes (or farms) having historical basis, a fairly plentiful work force, and fairly convenient transportation and communications have conditions for building production bases to raise cattle and sheep.

2. Variations Within the Region

This region is long from north to south and narrow from east to west. Latitude position as well as topographic and climatic conditions are not identical everywhere. When this is added to factors such as the historical development of agricultural production, though various similarities are apparent everywhere within the region, differences are also fairly great. The whole region may be divided into four subregions, north to south, on the basis of agricultural production conditions, characteristics, and future direction of development of each jurisdiction. These subregions are: The northern tea, grain and forest region; the eastern cash-crop and tea region; the central grain and forest region; and the southern grain, forest and fruit region.

A. The northern tea, grain, and forest subregion: This includes Jingdezhen City plus Wuyuan and Dexing counties. This subregion has a large mountainland and hill area. Since the subregion lies at a somewhat northern latitude, heat resources are slightly less in this subregion than in others, however, precipitation is plentiful. providing favorable conditions for the growth of tea and forests. This subregion has a long history in the growing of tea, and its tea plantation area accounts for 58 percent of the eastern Jiangxi agricultural region's total tea plantation area. In 1979, gross output of tea was about 75 percent of the total for the east Jiangxi agricultural region. The forest area within this subregion is also very widespread. Wuyuan and Dexing counties alone annually provide the country with more than 130,000 m^3 of timber. Jingdezhen also provides about 20,000 m^3, and potential is very great for development of forestry production. Future development of this subregion's agricultural production will require satisfactory handling of the relationship between grain and tea, and grain and forests, suiting general methods to specific circumstances with either tea being dominant or forests being dominant, and efforts to build a group of fairly large continuous-tract tea-growing bases and timber bases. In grain production, most important is increase in yields per unit of area.

B. Eastern cash crop and tea subregion: This subregion is located in the most easterly part of the province. It includes Yushan, Guangfeng and Shangrao counties plus Shangrao City. The land area is relatively small and is made up of hills and mountains. Since the Yushan River valley

in the upper reaches of the Xin River is a communications route for travel into Zhejiang Province through which the Zhejiang-Jiangxi railraod passes, communications facilities are readily available. As a result, population is dense, and the economy fairly well developed. In 1979, population density for the subregion as a whole was 319 per sq km making it one of the most densely populated areas in the entire province. In this subregion, grain farming is dominant, the growing of cash crops accounting for only a small percentage of farming. In 1979, the area planted to cash crops reached 177,000 mu, which was 8 percent of the total area sown to cash crops, making this a subregion of the eastern Jiangxi agricultural region with a fairly high percentage of cash crops. Guangfeng tobacco, Yushan sugarcane, and Guangfeng and Shangrao jute are famed within the province. Tea is this subregion's main economic forest tree, making this subregion the second most important tea-growing area in the eastern Jiangxi agricultural region. Growing area and output accounted for 26 and 15 percent respectively of the agricultural region total. Though this subregion's grain yields per unit of area are high (in 1979, grain yields averaged 1,089 jin per mu of cultivated land), and though the percentage of cash crops grown is relatively high and the economic forest area large, since population is heavy relative to the amount of cultivated land (in 1979, cultivated land averaged only 0.73 mu per capita), the masses' earnings and standard of living are relatively low. In 1979, net income for the subregion as a whole averaged only slightly more than 60 yuan per capita, and grain rations averaged only 520-odd jin per capita, both much, much lower than the average for the province as a whole. In Guangfeng County, income averaged only 49-odd yuan per capita, and grain rations averaged only 466 jin per capita, the lowest in the whole province. In future, full use will have to be made of the advantages this subregion enjoys in a large population, numerous mountains and many cash crops for energetic revival and development of the growing of cash crops and tea, and the operation of forestry and animal husbandry production. The subregion will have to hasten development of commune and brigade enterprises and also give attention to control of erosion, changing agricultural production conditions, further increase in grain yields per unit of area, diligent exercise of planned parenthood, and genuine control of population growth.

C. The central grain and forest subregion includes Qianshan, Hengfeng, Yiyang, Guixi and Yingtan counties, 39 percent of which is a mountainland area in which heat and water resources favor development of farming and forestry. Grain production holds an important position here. In 1979, this subregion provided 326 million jin of marketable grain (including grain purchased at negotiated prices), or 27 percent of the total for the whole agricultural region for second place as a grain-producing area after the southern subregion. Though this subregion's forestry production cannot compare with that of the southern and northern subregions, it has a fair amount of barren mountains suitable for forests, and development potential is rather large. Qianshan County's moso bamboo resources make it one of the counties with plentiful reserves in both this agricultural region and in the whole province. In the future, positive action must be taken to make further use of this subregion's advantages to do a good job of agricultural production with the emphasis on grain and forests.

D. The southern grain, forest and fruit subregion. This subregion includes Jinxi, Zixi, Lichuan, Nancheng, Chongren, Yihuang and Le'an counties. This subregion is between 70 and 90 percent hills and mountainlands in which heat, precipitation and soil resources are very plentiful. It is an area of relatively small population and many fields and mountains in which the cultivation and reclamation index is relatively low. Conditions for development of farming, forestry, animal husbandry, sideline occupations and fishing are rather superior, and potential is very great. This subregion is an important grain-producing area for the eastern Jiangxi agricultural region, and it is also one of the province's major bases for grain production. In 1979, its cultivated land was 6.3 percent of the province's total, and its gross output of grain was 7 percent of the province's total. State grain purchases amounted to 9.3 percent of the total for the province. Clearly, a firm grip on grain production is one of the important tasks for agricultural production in this subregion. Forestry production also holds an important position in the province. The subregion has a vast forest area containing large live timber reserves. Timber reserves in Zixi, Le'an, and Yihuang counties alone amount to one-half the total for the Fuzhou administrative region. This subregion is also an important producing area for oranges and tangerines in the province. The famed Nanfeng honey oranges are produced here. Output amounts to more than one-sixth orange and tangerine output for the province as a whole. Nanfeng and Jinxi have opened very many new orange groves in recent years. In addition to growing Nanfeng honey oranges, it is growing many Wenzhou honey oranges for the first time, and potential for further development is very great. In addition to continuing a vigorous increase in grain output and turning in a good performance in forestry and citrus production, it will be necessary in the future to expand the growing of tea as feasible, and to devote serious attention to animal husbandry, the fishing industry, and mountain region medicinal herbs.

Third Section. Several Problems in Further Development of Agricultural Production

1. Problems in Development of Tea Production

Tea is an agricultural product with a fairly high economic value. Development of tea production permits full use of red earth hills and downlands, and barren hillside soil resources to increase income and provide funds for expansion of agricultural production. In addition, since most of this region's tea output is provided for the export trade, the diverse kinds of tea hold important significance in helping the nation's socialist construction. The region's natural conditions are suited to the growing of tea shurbs, and the working people have long been accustomed to and have experience in the growing of tea. The region's tea output today accounts for more than one-half the total for the whole province. Full use of the region's favorable conditions to accelerate development of tea production and to build tea bases that produce consistently high yields is an extremely important task in this region's agricultural production. It is also the key to advancing development of tea production in the province as a whole.

Despite revival and development of the region's tea production since liberation, in an overall sense the speed of increase has been relatively slow and is a fairly long way from the all-time high level.[5] The gap between this region and numerous advanced regions in the country is even greater.[6] In 1979, the region's tea yields averaged only 27 jin per mu, which though somewhat higher than the provincial average (the provincial average being 20.5 jin per mu), were only one-half the average national yield per unit of area. Development was also very uneven from one county to another within the region, and differences in yields per unit of area were also very great among communes and brigades in the same county and having similar conditions. This indicates a tremendous potential for increase in tea production. The main reasons accounting for the current fairly low tea yields per unit of area are the disturbance and damage caused by the ultraleftist line of Line Biao and the "gang of four," and failure to institute economic policies, which dampened tea farmer enthusiasm for production. Frequently no attention was paid to habitat conditions, production measures applied with arbitrary uniformity. In addition, numerous places one-sidedly sought to have a large tea plantation area while ignoring increases in yields per unit of area. Standards were low for newly developed tea plantations, care non-intensive, and numerous new tea plantation delayed without being able to go into production or had very low output. Furthermore, old tea plantations were not very well managed or replanted on time. This resulted in a deterioration of tea plantations and a decline in output. Furthermore, no diligent research was conducted on scientific tea-growing methods.

In view of the foregoing problems, measures providing direction for hastening development of this region's tea production are as follows:

A. Institution of a rational economic structure in tea-growing areas whereby tea is dominant in a combination of tea growing, farming, forestry, and animal husbandry. Tea is the production sector with greatest marketable product significance for numerous counties in this region. The health of tea production normally affects development of this county's entire agricultural development. In tea base counties in particular, where output value of tea is proportionally large (as in Wuyuan County

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5 According to the 1936 edition of "Jiangxi Annual Report," at the beginning of the century the province had 130,000 mu of tea plantation area, and tea output reached more than 300,000 dan. Hekou (Qianshan) and Jiujiang were the centers of tea production, and the counties comprising the east Jiangxi agricultural region (Wuyuan excepted) produced more than 50 percent of tea output.

6 In 1978, tea yields averaged 60 jin per mu for the country as a whole. Some counties harvested 100 jin per mu, some communes 200 jin, some production brigades 300 jin, and some bumper-yield tea plantations 1,400 jin per mu. The world leader in tea yields per unit of area is Japan, which produced 300 jin in 1973.

where the output value of tea accounts for 20 percent of the gross output value of agriculture), for many communes and brigades (or farms) earnings from tea are the major source of cash. Making tea dominant in tea-growing areas fits in with the realities of tea base counties and communes where the hill and mountain area is large, and the cultivated land area is small. Practice has demonstrated that emphasis on tea production in tea-growing areas while simultaneously carrying out farming, forest and animal husbandry production is able to advance development of the entire national economy.

The broad masses of people in this region's tea-growing areas have proceeded from realities and have suited general methods to specific circumstances in development of tea, farm, forest and animal husbandry production, accumulating abundant experiences. They hav- also gradually fashioned an economic structure with a rational pattern in which tea is paramount, and tea, farming, forestry and animal husbandry are interlinked. In general, timber has been planted on steep mountain peaks, either tea or rapeseed planted on gentle slopes facing the sun, fruit trees and grain grown in mountain foothills, and paddy rice grown on low land in mountain valleys. At the same time, they have developed animal husbandry with the raising of hogs. Development of forestry in tea-growing areas can increase output of timber and bamboo and can also regulate the microclimate, increasing air moisture to create suitable conditions for tea growth, helping increase the quantity and quality of tea production.[7] It can also solve the fuel problem in tea-growing areas (including fuel required to process tea). Growing of grain crops in mountain valleys can solve grain ration problems of tea farmers right in the local area, thereby reducing the burden on the country. Development of hog, cattle and goat raising can make use of the vast fodder sources available in hill and mountain regions, increase the meat supply, provide tea shrubs with fine-quality organic fertilizer, and promote increase in tea yields per unit of area. Tea production also provides funds for development of farming, forestry and animal husbandry production. However, because of the one-sided emphasis on taking grain as the key link some years ago, some places destroyed tea shrubs in order to grow grain, and supplanted tea with grain. A few places also one-sidedly pursued a large area of tea plantation. They destroyed forests in order to grow tea, thereby damaging the rational economic structure built up over the years. This brought about competition for land between tea and grain and between tea and forests, as a result of which both quantity and quality of tea production declined. This also damaged ecological balance and intensified erosion. Action must be taken to

7 Counties such as Wuyuan County have been accustomed to intercropping tea plantation with Chinese tallow trees to provide shade and protection, and to regulate the microclimate. Dried branches and fall leaves from the tallow trees increase soil organic matter, and also serve to kill insects. They have thus been able to increase tea quantity and quality. Analysis shows that tea that has been shaded by forest trees receives fewer of the ultraviolet rays in sunlight, and this is beneficial in increasing the catechu in tea for better quality tea.

to correct this situation quickly, and general methods must be suited to specific circumstances for rapid revival and development of tea and forest production. Specific places will have to withdraw from the growing of grain to return to tea production and gradual restoration of ecological balance. Zihu Commune in Yushan County located in the Huaiyu mountain region has a population of more than 20,000 and more than 10,000 mu of wetlands, which averages out to ½ mu of fields per capita. On the other hand, themountainland area is 24 times larger than the wetland area. They proceeded from reality of a large population relative to farmland and a vast mountain area, suiting general methods to their specific circumstances in resolute pursuit of a program of all-round development with tea growing being paramount. They planted timber forests in high and distant mountains, and grew economic forests consisting mostly of tea shrubs on low mountains and mountains around the edges of fields. They cleared the foot of mountains to create fields and develop grain production. They have opened nearly 9,000 mu of tea plantations since 1976. This plus the former 2,000 mu of tea plantations forms 10,000 mu of tea plantation base that annually provides the country with more than 280 dan of tea. Grain production has also developed greatly.

B. Stabilization of the existing tea plantation area and building new tea plantations of high standard. Tea plants are a perennial crop, and shrubs may grow to be more than 100 years old. Once planted, they cannot be moved easily. Development of new tea plantations must proceed from the long-range benefits to be gained, and comprehensive planning must be done. A look at conditions required for growth and development of tea shrubs shows that tea plantation bases should be chosen from places with a gradient of less than 25 degrees that consist of a fairly large and continuous tract on either a sunny hillside or in an open valley. The site also should have no violent changes between cold and hot. The soil should be fairly fertile, the soil layer fairly thick, and the pH between 4.5 and 6.5. Forest cover should be dense and water ample. In addition, the labor force should be plentiful, transportation facilities fairly convenient, and fuel fairly available. All the counties in this region have proceeded from realities since liberation, and they have suited general methods to their own specific conditions for the opening of numerous new tea plantations. The tea plantation area has increased greatly, and has laid a foundation for development of tea production. It must be realized, however, that in the development of tea plantations on hillsides in recent years, some communes and brigades have paid no heed to habitat conditions, have ill-advisedly pursued area expansion, and have not watched the quality of reclamation. They have thus provoked serious erosion, and numerous tea plantations have become "three running tea plantations" [runoff of water, soil and fertilizer]. Some tea plantations have not emphasized care, so growth has been very poor, resulting in young tea trees not growing into forests after many years. They are either unable to begin producing or else their yields are very low, averaging only 10-odd jin per mu. This is one of the major reasons for the fairly low tea yields per unit of area in this region. A look at current realities shows a great decline

has already occurred in the amount of barren hillsides in this region that have the earlier mentioned conditions suiting them for use as tea plantations. Consequently, over the short run, except for some places having the earlier stated conditions for reclamation as new tea plantations that may continue to expand the tea plantation area, most counties should carry out no further area expansion. Instead, they should concentrate on consolidating and upgrading existing tea plantations, and on vigorous increase in new tea plantation standards and quality. To summarize experiences everywhere in the building of consistently high-yielding tea plantations, building tea plantations of high standard requires the following: comprehensive planning, tackling problems of mountains, water, fields, plantations (tea plantations) and roads, in a comprehensive way; acting on the principles of proper concentration of growing on continuous tracts to achieve the specialization of production (a mass movement for reclamation, and care by a specialized corps); and introduction of superior varieties, terracing of mountains, standardization of planting, provision of water conservancy for irrigation, and mechanization of operations to achieve consistently high yields once tea plantations have begun to produce. Shangrao County is a hill and mountain region that is "70 percent mountains, 10 percent water, 10 percent fields, and 10 percent roads and manors." Tea is one of the main economic forest trees in the county, and it has a long history in the growing of tea. Proceeding on the basis of a local geography and historical conditions, since 1973 this county has developed more than 60,000 mu of tea plantations concentrated on continuous tracts for a tea plantation area totaling more than 100,000 mu. They have persevered in suiting general methods to specific circumstances, all-round planning, appropriate concentration, and rational patterns. They have concentrated tea growing on continuous tracts within production brigades, for the most part, and have taken a firm hold on the building of tea plantation bases of 500 mu and larger. They have gone in for large-scale building of tea plantation bases centering around soil improvement and the harnessing of water. By now the county has already built 65 tea production bases that are 500 mu or larger in area, including 18 bases that are between 1,000 and 2,000 mu or larger in area. Most of the new tea plantations follow hill contours; there are few gaps in tea plants, and growth is good. This has laid a foundation for the building of tea bases producing 50,000 dan of tea, and has provided experiences in the building of high standard new tea plantations.

C. Improvement of conditions, strengthening of management and energetic transformation of old tea plantations. This region is an old tea production base of importance to the province and to the nation as well. It has a long history in the growing of tea, and old tea plantations form a substantial percentage of the total number.[8] Many of these are scattered about helter-skalter making management and picking extremely inconvenient.

8 Prior to liberation, this region's tea plantations were widely scattered on low mountains and hills, and on river valley plains. There was mountain tea (grown on low mountains and hills), sandbar tea (grown on sandbar land in river valley plains), [footnote continued on next page]

Tea shrub clumps are skimpy and there are numerous gaps among plants. Plants are old and worn out, and yields are very low. Many tea plantations have no terraced fields, so erosion is serious even to the point where plant roots protrude. Some of the tea plantations that have been developed since liberation are also poorly managed, with the result that plant vitality has degenerated prematurely and yields are not high. Therefore, vigorous improvement of production conditions in old tea plantations, strengthening of tea plantation management, and transformation of low-yield old tea plantations quickly are yet other important actions that may be taken to hasten development of the region's tea production.

D. Vigorous promotion of superior tea shrub varieties and institution of scientific farming. This region has quite a few superior tea shrub varieties, but since they have not been conscientiously bred and promoted, varieties on most tea plantations are mongrels with low yields. Active measures should be taken for vigorous breeding and promotion of superior tea shrub varieties. In recent years, Wuyuan County scored high yields from diligent breeding of the nationally approved superior "Shangmeizhou" variety. This is an asexually reproduced shrub characterized by early budding (7 to 10 days earlier than traditional varieties), large leaves and sturdy buds, numerous pekoes and strong adaptability. Wukou Tea Farm in Wuyuan County promoted the breeding of 220 mu of "Shangmeizhou" for yields averaging 150 jin per mu. Now, Wuyuan County annually ships out more than 1 million "Shangmeizhou" tea seedlings. The "Damianbai" variety bred in recent years by Shangrao County is also an asexually reproduced shrub that is strongly resistant to diseases, buds early, maintains tenderness well, has long and sturdy buds and numerous pekoes, and has yields 30 to 50 percent greater than local varieties. In addition, the oak leaf varieties from Jingdezhen and the Qimen areas of Anhui Province, which was originally "Fuding big white tea" and "Zhenghe big white tea" from Fujian Province are superior varieties that are strongly adaptable, produce high yields, and are suitable for promotion in this region. Selection of some base tea farms to establish superior variety female parent tea plantations, and promoting the reproduction of the aforementioned superior tea varieties by suiting general methods to local situations, is a key measure in the improvement of tea yields.

[footnote continued from previous page] field ridge tea, and garden tea (tea intercropped with vegetables). As a result of changes made following liberation, tea is longer grown on the ridges in fields or in gardens, and the old mountain tea plantation and sandbar tea-growing area has been greatly reduced. According to a survey done in Wuyuan, a tea-growing county, sandbar tea is grown on approximately only 5 percent of the tea plantation area or 30 percent of the old tea plantation area. Since the soil on which sandbar tea is grown is fertile, water and fertilizer conditions good, and care intensive, yields are fairly high and tea quality is good. However, sandbar tea competes with grain for land, so large-scale growth has been curtailed.

E. Hastening mechanization of tea production and satisfactory solution to fuel problems. Up until the time of liberation, hand tools and simple implements were used for the preliminary processing of all this region's tea. Labor was intensive; the productivity rate was low, and tea quality was impaired. After liberation, the level of mechanization of the region's tea processing rose steadily. For example, Wuyuan County has built three tea refineries (and work is underway to construct another one), as well as 420 preliminary processing plants that have gone into production. Ninety percent of all preliminary tea processing is mechanized, and this has advanced development of tea production. However, the level of mechanization is not high for the region as a whole, and even in Shangrao County, the key tea-producing county in the province, only about 25 percent of preliminary processing is mechanized today. In all other counties, the percentage of hand processing of tea is even greater. Picking and pruning is also done by hand. Because of the hand picking of tea, a lot of labor is required to process tea. A labor force of more than 70 per 100 mu of tea plantations is required for processing. The processing period for spring-picked tea coincides with the very busy season for spring plowing, so the competition between tea and grain for the labor force is extremely sharp. As the tea plantation area expands, as young shrub tea plantations go into production one by one, and as yields per unit of area increase, this competition will increase dramatically. Thus, effective action must be taken for the earliest possible mechanization of tea production in order to increase the labor productivity rate in tea production, to reduce labor intensivitiy, and to raise tea quality as well as to ameliorate the competition between tea and grain for the labor force. First, vigorous efforts must be made to increase the level of mechanization of existing preliminary tea processing. (The Shangrao County experience shows that mechanized processing of tea not only raises the labor productivity rate and reduces processing costs by 20 percent over hand methods, but tea leaf quality rises as well, each jin of dry tea rising by from 2 to 3 grades). At the same time, conditions must be gradually created for the mechanization of transportation, disease and insect prevention and control, cultivation to eliminate insects, tea picking, pruning and irrigation to hasten all-round mechanization of tea plantation operations and tea production. For commune tea farms that have a large tea plantation area, that have high tea yields, that make a great contribution, and in which competition between tea and grain for the work force is extremely sharp, more assistance for tea machines is extremely necessary.

No matter whether preliminary tea processing is done by machines or by hand, there is a fuel problem that has to be solved. Given present technological conditions, 5 jin of firewood are required for even dan of tea that is preliminarily processed. A county that produces 50,000 dan of tea will annually have to burn 12,500 m^3 of firewood (2,000 jin of firewood converts to 1 m^3 of timber), quite an appreciable figure. Though this region's forest resources are fairly plentiful, extremely great waste has occurred as a result of the burning of firewood over a long period of time. It is recommended that places having coal

resources should use coal as fuel insofar as possible. Places lacking coal resources should be sure to conserve timber. In future opening of new tea plantations, appropriate firewood bases should be set up.

2. Problems in Development of Grain Production

Grain is the main sector in this region's farming industry. As agricultural production conditions have steadily improved since liberation, grain production has developed substantially, and the region has now become one of the hill and mountainland regions of the province in which grain is plentiful. Not only does it satisfy the need for grain in the region's areas producing tea, forest, citrus and cash crops, but a certain amount of grain is shipped out of the region as well. In 1979, this agricultural region provided 1,212,000,000 jin of marketable grain (including grain procured at negotiated prices), which was 19 percent of the total for the province, and it shipped out a net 285 million jin of unprocessed grain. However, in an overall sense, this region's level of grain production is still not high, and a very long way from advanced levels inside and outside the province. In particular, development is very uneven between one county and another within the region, and further tapping of the region's potential to produce more grain, as well as a vigorous increase in the level of grain production is yet another major problem in development of this region's agricultural production.

This is primarily a hill and mountainland region in which the plains and low hill and downlands area is relatively small. In most counties (or cities), there is little land left for reclamation. In eastern, central, and northern areas, in particular, where population is heavy and the cultivation and reclamation index is fairly high, most wasteland resources have already been reclaimed for use. Now soil erosion is serious, so there should be no further clearing of wasteland to expand the growing of grain. Though some wasteland resources can be reclaimed in southern areas, there is a shortage of labor, and existing farmland yields per unit of area are low. Therefore, a look at the region's natural conditions, historical foundation, and agricultural economic structure shows development of grain production requires mostly vigorous efforts to raise existing yields per unit of area. Generally speaking, the grainfields area cannot be expanded further. In a few places where grain crops have squeezed out traditional cash crops, depending on specific circumstances, grain should give way to cash crops, or to tea, or to forests, or to fruit growing in order to fashion a sensible agricultural economic structure. In view of the region's problems in grain production, measures that set the course for vigorous increase in yields per unit of area are as follows:

A. Large-scale farmland capital construction centering around soil improvement and harnessing of waters, expansion of the consistently high-yield farmland area, and improvement in agricultural production conditions. This region(particularly all the counties in Shangrao Prefecture) is a part of the province in which water conservancy

construction has developed fairly rapidly. However, the level of farmland capital construction is currently not yet high. There is a long way to go to meet requirements for consistently high-yield fields with 1 mu per capita of agricultural population that is able to deliver a crop despite drought or waterlogging. Water conservancy problems remain the key to development of this region's agricultural production, and they must be conscientiously addressed. It is necessary to proceed, first of all, from the characteristics of this region in having numerous mountains and hills, many water systems, much water and rapidly flowing water, and to suit general methods to specific circumstances mountain ridge by mountain ridge and basin by basin, formulating comprehensive plans for tackling mountains, water, fields, forests and roads centering around soil improvement and the harnessing of waters with the goal of building consistently high-yield farmland that can deliver a harvest despite drought or waterlogging. It is necessary to do all-round planning that takes into account the relationship between upper and lower reaches. It is also necessary to make full use of plentiful waterpower resources by building more power stations to increase the supply of electric power. Second, it is necessary to strengthen the complete equipping of projects, to take firm hold of key elements, to shorten construction time for farmland water conservancy projects, and to make full use of benefits from existing projects. According to 1977 data from Jinxi County, had that county's water conservancy projects been completed according to design standards, it would have been able to irrigate 270,000 mu, or more than 70 percent of the cultivated land area. However, for want of full equipping of projects, or poor-quality construction that permitted serious leaks, and lack of safety, actually only an area of 180,000 mu could be irrigated. During the winter of 1977-1978 and the spring of 1978, the county devoted extremely serious attention to fully equipping the project, to tapping potential, and to continuing construction for an expansion of the irrigated area by more than 55,000 mu. Clearly, full use of existing water conservancy facilities, fuller tapping of potential and completion of projects are major ways in which to develop water conservancy projects at the present time. Third is quickening of the pace of farmland water conservancy construction in places having a weak foundation. Administratively, this region is a part of two administrative regions and one provincially administered city. Variations are relatively great in natural and socioeconomic conditions and in the existing foundation for each jurisdiction. Development of framland water conservancy endeavors is also very uneven between one county and another or even among communes and brigades within a single county. In the northernmost and southern parts of the region, in particular, the foundation for water conservancy construction is relatively poor, and grain yields per unit of area are low. Effective action will have to be taken to hasten development in order to quickly raise this region's level of grain production. Fourth is the vigorous transformation of low-yield fields. In the farflung hill and mountain regions, there is a large area of low-yield, cold, waterlogged fields, which serious impair efforts to increase grain yields per unit of area. It is necessary to focus on the characteristics of these low-yield, cold, waterlogged fields, and to make energetic efforts to transform them.

B. Expansion of sources of fertilizer, and increase in the level of fertilization. This is yet another key measure for vigorous increases in the region's grain yields per unit of area. First of all, major efforts have to be made to develop animal husbandry, with large-scale raising of livestock and collection of their manure. While continuing to keep a firm grip on hog production, full use must be made of the region's fairly plentiful grassy mountains and grassy hillsides to hasten development of the raising of cattle and goats. This will not only increase exports and increase earnings, but will also provide a source of fertilizer for agricultural production. In raising hogs, the penning of hogs and collection of their manure should be promoted, and bedding should be used in hog pens to increase the amount of manure collected and improve the quality of the manure. Second, green manure yields per unit of area should be increased and new varieties of green manure developed. This region used to pay considerable attention to the growing of green manure, and this is one reason why its early rice crop yields have been fairly stable over the years. Diligent attention should continue to be given to this. It is particularly important to take action for further increases in green manure yields per unit of area. Chinese milk vetch yields per unit of area today stand at 2,000-3,000 jin per mu. Care should be intensified and more phosphate fertilizer should be used. Inoculation with root nodules can also be done to increase yields per unit of area. There should be active promotion of the growing of aquatic green manure such as red azolla, water peanuts [Alternathera philoxeroides], water cabbage, and water hyacinths, which hold major significance in increasing late paddy yields in a two-crop system. For many years, Yihuang County has experimented with promotion of the raising of azolla in paddyfields, and has been successful. It has been able to increase yields of late paddy by from 10 to 20 percent or even more. Practice has shown that when paddy fields are stocked with red azolla, it reproduces fast, has high yields, makes good fertilizer and costs are low. It is an effective way of increasing fine-quality organic fertilizer for late paddy in a two-crop system. This region has a large mountain forest area in which the cutting of green grass, burning of fire clay, and collection of pond mud are important ways of increasing organic fertilizer. Third is full use of the region's fairly plentiful sources of mineral fertilizers, particularly plentiful phosphate minerals, making the most of production potential of existing chemical fertilizer enterprises in a major effort to increase chemical fertilizer output in order to raise the region's use of chemical fertilizer.

C. Rational reform of the farming system and practice of scientific farming in consonance with mountain region and hill characteristics (See pertinent portions of the Fourth Section of Chapter Four of this publication, "Problems in Development of Mountain Region Grain Production).

Chapter 6. Central Jiangxi Jitai Basin Grain, Oil-Bearing Crops, and Fruit Agricultural Region

Administratively the central Jiangxi Jitai Basin grain, oil-bearing crops, and fruit agricultural region includes Xin'gan, Xiajiang, Anfu, Jishui, Yongfeng, and Ji'an counties, plus Jia'n City, Taihe, and Wan'an counties. The whole agricultural region is approximately 18,700 sq km in area, which is 11.3 percent of the total land area of the whole province. In 1979, it had approximately 4.96 million mu of cultivated land area, and a population of 2.69 million of which 2,358,000 was agricultural population. This was 13 percent of the province's total cultivated land area and 8.3 percent of its population.

This agricultural region is located in the middle reaches of the Gan River and is a fairly self-contained basin centering around Ji'an and Taihe counties. Natural conditions and agricultural production are strikingly transitional between north and south. Within the region, hills and downlands alternate with river valley plains. The climate is warm and moist, but midautumn droughts are numerous. Most important farm crops are paddy, rape, sesame, peanuts, cotton, sugarcane and jute. Citrus production is highest in the province, and the region has a certain output of rape, timber and bamboo.

This region is somewhat smaller than other agricultural regions in the province; population is small relative to cultivated land, making the burden on the work force fairly heavy, and both average per capita production and grain contributed to the country are relatively high. This is an important marketable grain base in the province. However, current yields per unit of area are relatively low; development is uneven, and considerable potential exists. Citrus, sugarcane, and jute output hold significance as interregional commodities.

First Section. Agricultural Production Conditions

1. Basin Topography Dominated by Hills

This region is surrounded by mountains and hills to the east, west and south. To the north it adjoins the Boyang Lake plain, and the mainstream of the Gan River traverses the central part of the region. There is a certain percentage of all kinds of landforms throughout the region including mountainlands, hills, basins and river valley plains, including 30 percent mountainlands, 50 percent hills, and 20 percent plains (including water surfaces and some downlands). (See Table 6-1) The aforementioned various kinds of topography are even found within a single county. As compared with other agricultural regsions, this region exhibits a diversity of landform types, which is an extremely favorable condition for the region's all-round development of farming, forestry, animal husbandry, sideline occupations and the fishing industry.

Table 6-1. Statistical Table For Types of Landforms in Each County of the Central Jiangxi Agricultural Region

a) 县、市	土地面积 b) (平方公里)	山 c) 地		丘 d) 陵				平 e) 原 (包括水面和部分岗地)	
		面积 f)	占土地面积% g)	高丘面积 h)	占土地面积% g)	低丘面积 i)	占土地面积% g)	面积 f)	占土地面积% g)
j) 全区合计	18693.0	5662.0	30.3	2634.0	14.1	6711.0	35.9	3686.0	19.7
k) 新干	1248.0	399.0	32.0	129.9	10.4	219.1	17.6	500.0	40.1
l) 峡江	1287.0	154.0	12.0	182.4	14.2	486.6	37.8	464.0	36.1
m) 安福	2792.0	1675.0	60.0	52.8	1.9	840.2	30.1	224.0	8.0
n) 吉水	2746.0	535.0	19.5	523.2	19.1	986.8	35.9	701.0	25.5
o) 永丰	2695.0	970.0	36.0	404.8	15.1	1077.2	40.0	243.0	9.0
p) 吉安	3084.0	648.0	21.0	261.5	8.5	1280.5	41.5	894.0	29.0
q) 吉安市	133.0	/	/	5.0	3.8	/	/	128.0	96.2
r) 泰和	2663.0	586.0	22.0	463.7	17.4	1081.3	40.6	532.0	20.0
s) 万安	2045.0	695.0	34.0	610.7	29.9	739.3	36.1	/	/

Key:
a) County or city
b) Land area (sq km)
c) Mountainlands
d) Hills
e) Plains (including water surfaces and some downlands)
f) Area
g) Percentage of land area
h) High hill area
i) Low hill area
j) Total for whole region
k) Xin'gan
l) Xiajiang
m) Anfu
n) Jishui
o) Yongfeng
p) Ji'an
q) Ji'an City
r) Taihe
s) Wan'an

A. Mountainlands: This region has a more than 5,662 sq km of mountainland area, which is found mostly on its eastern and western sides and on its southern fringe. In the east, the Yu Shan Range juts to the west and peaks are more than 1,000 m above sea level. At the junction point of Yongfeng, Le'an, and Ningdu counties, Linghua S-an is 1,454.9 m above sea level. Dawu Shan in Donggu, Ji'an County is 1,204.5 m above sea level, and in the northwest lies Wugong Shan at an elevationof 1,500 m above sea level, its main peak, Jindingling being 1,918.3m, making it the highest peak in this region. Most of the mountains in this region are of the low mountain type at an elevation of from 500 to 800 m. The natural soil is mountainland yellowish red soil and mountainland yellow soil. Plant cover is fairly heavy, and the region's main forestry base is located here. Tea oil forests are found over a fairly wide area; farmlands are concentrated in mountain basins and in alluvial valleys; irrigation conditions are relatively good; the soil is relatively fertile, and most of it has been developed into two-crop paddy fields. Some of the mountain alluvial fields are fairly high up, so water and soil temperatures are relatively low. They are low-yield, cold, water-logged fields that grow a single crop of late paddy for the most part. In this regions, the area of medium mountains at more than 800 m above sea level is relatively small. Climate, coil and vegetation cover vary with vertical rise.

B. Hills. Hills occupy a substantial area in this region, covering approximately 9,345 sq km. Their relative elevation is approximately 100 to 200 m, and their slope ranges from 20 to 30 degrees. They are found mostly on the forward fringes of low mountains and around basins. The soil is loose and contains fairly plentiful organic matter. Vegetation cover consists mostly of masson pine and China fir forests, grass and scrub growth. There is also a substantial tea oil forest area. Farmland consists largely of ridged fields and river shore fields. This is a major farming area of this agricultural region. Currently, mostly two crops of paddy are grown, however, yields are relatively low, and potential for increased yields is relatively high. Following liberation, hill regions built a number of timber forests and economic forests, but these cannot yet be used to the full. Prospects for development of forest production and economic diversification are extremely bright.

Of all the hills of this region, the low hill area is most extensive amounting to more than 9,000 sq km. Low hills are found all around the Jitai and Yongfeng basins as well as on both sides of rivers. Their elevation above sea level ranges from 70 to 200 m. Natural cover consists mostly of thin growth of masson pine and of grass and shrubs. Some areas are lightly to moderately eroded. Downlands are found mostly in the middle of basins and along both shores of streams. Most have been formed from the cutting of high terraces by streams, and the material of which they are composed is mostly either a red soil and gravel layer or dyktyonic red soil. Types of farmlands in low hill regions are mostly ridged fields and stream bank fields. Irrigation is fairly convenient at the middle and lower levels of large ridges, and this is the major section of the low hill and downlands regions for development of two

crops of rice. Irrigation conditions are fairly poor on stream bank fields and a large percentage of single-crop early rice is grown on them. It is now generally felt that there is not sufficient irrigation water for agriculture in low hill and downland regions, and that these regions are prone to drought. Major efforts to build small reservoirs and mountain pools to solve the irrigation problem is one of the keys to development of agricultural production.

C. River valley plains: This region has approximately 3,686 sq km of plains area (including some downlands), second in the province only to northern Jiangxi. Plains are found mostly on both shores of the Gan River and its large and small tributaries. They vary in width, averaging about 800 m or so. Their relative elevation is about 15 m, a plus for machine operations. Most of this agricultural region's farmland is concentrated on these plains, which are the most important concentrated growing areas for grain crops and cash crops. Farming soils are relatively fertile sandy clay and black clay for the most part. Since most streams can be easily dammed up, gravity irrigation is used and water is plentiful. With steady improvement in water conservancy conditions since liberation, agricultural production has steadily climbed. The main grain crop is double crops of paddy. In the sandy fields along both shores of rivers, general methods have been suited to specific conditions for development of the growing of cash crops such as cotton, jute, sugarcane and peanuts, as well as of fruits such as tangerines and oranges.

2. Ample Heat; Drought Prominent

Since this is a basin area, most of the farmland is found on red earth hills and downlands where the vegetation cover is relatively sparse. Heat conditions are better than in the three previously dexcribed agricultural regions, but the amount of precipitation is less than for other regions at the same latitude. (See Table 6-2).

Sunshine conditions: This region has plentiful sunshine, sunshine averaging approximately 1,800 hours annually for a sunshine percentage rate of approximately 41 percent. This favors the growing of two crops of paddy, sugarcane, jute and cotton. This region holds very great potential from the standpoint of light-energy use.

Heat conditions: This region's annual temperature averages 18.0°-18.5°C. During the coldest month, January, average temperature is 5.5°-6.5°C. During the hottest month of July, the average temperature is 29.5°C. Lowest temperature in winter is approximately -7° to -9°C. Highest summer temperature is 40°C or higher. Winters are generally fairly mild, and summers are stifling hot.

Table 6-2. Climatic Statistical Data For Representative Counties in the Central Jiangxi Agricultural Region

Units: °C, Millimeters,
Hours, Days

a) 代表县	平均气温 b)			极端气温 c)		10℃积温 d)			e) 年平均降水量	f) 日照时数	g) 无霜期
	年温	一月	七月	最高	最低	初日	终日	积温			
h) 吉安	18.4	6.2	29.5	40.2	-8.0	20/3	26/11	5804	1438	1795	279
i) 永丰	18.1	5.7	29.2	40.5	-9.4	20/3	23/11	5725	1570	1764	278

Key: a) Representative county
b) Average temperature
c) Extremes of temperature
d) Cumulative temperature at 10°C and above
e) Average annual precipitation
f) Hours of sunshine
g) Frost-free period
h) Ji'an
i) Yongfeng

This region has approximately 250 days when average daily temperature is stabilized at 10°C or higher, and cumulative temperature ranges from about 5,700°-6,000°C, higher than in neighboring agricultural regions at the same latitude. However, in the small basins near mountainlands on the edges of the region, heat conditions are somewhat lower than on plains and valleys because of the effects of the topography.

Moisture conditions: This region averages approximately 1,400-1,500 m of precipitation annually. In an overall sense, this is sufficient for the growing of two crops of paddy. However, most of the precipitation is concentrated during the growing season for early paddy. Generally, rainfall from April through June accounts for more than 50 percent of total rainfall for the whole year, and during some years when rainfall is overconcentrated, mountain torrents may occur. Moisture is generally felt to be insufficient for the late crop, and drought frequently occurs, particularly in places having poor water conservancy facilities. Thus, this region needs much building of water conservancy projects, development of powered irrigation, planting of trees for afforestation, and practice of crop rotation between wetlands and drylands in order to set the stage for consistently high yields in agriculture.

Though agricultural climatic conditions are superb in this region, natural disasters such as low temperatures, flooding and waterlogging, and drought do occur.

Spring cold: This region begins to warm up fairly early in spring. On average, the first day when average daily temperature stabilizes at 10°C is 20 March. Nevertheless, spring cold may occur after strong cold currents move southward. Years having many cold snaps were 1952, 1953, 1954, 1955, 1961, 1962, 1964, 1968 and 1970. Years when Qingming [around 5 April] cold snaps occurred were 1962, 1972 and 1976. In 1962, a cold snap around the time of the vernal equinox was followed by a Qingming cold snap (21-23 March and 3-5 April). A serious Qingming cold snap took place in 1976 when large amounts of fine seeds rotted completely occasioning very heavy losses.

Flooding and waterlogging: Most of this region's flooding and waterlogging disasters are from mountain torrents that come on very suddenly and fade quickly. They occur mostly between April and July, largely along the shores of rivers. Flood years since liberation have been 1954, 1962, 1968 and 1970. The record shows large flooding in this region during 1915 (Yi-mao) when cities and countryside alike were inundated worse than during the past 100 years.

Drought: Droughts frequently occur in this region, and a midautumn drought of varying degrees of seriousness occurs virtually every year. The one in 1963 was particularly serious. Ji'an, for example, received only 985 mm of precipitation for all of 1963, and precipitation equal to or greater than 25.0 mm fell on only 8 days during the entire year. Grainfields cracked and farm crops withered.

Low autumn temperature: The usual time for occurrence of low autumn temperatures is from 5 to 10 October, but they sometimes occur early, as was the case on 2 September 1977. Low midautumn temperatures come somewhat earlier close by mountains, and the late crop is in danger of cold damge.

3. Heavy Burden on the Work Force; Great Potential for Soil Utilization

For historical reasons, this region has become an agricultural region in the province with a small population relative to cultivated land. Today the region averages 2.1 mu of cultivated land per capita of agricultural population. Each member of the work force is responsible for 5.75 mu of cultivated land, 2.01 mu more than the average for the province as a whole. This is the agricultural region of the province in which the work force carries the heaviest burden. As a result of natural and socioeconomic conditions, manpower and animal power are also distributed unevenly within the region. In Ji'an and Jishui, the burden is fairly light, but it is relatively heavy in all other counties. Xiajiang County is the county in which the work force bears the heaviest burden in the whole region and in the whole province, with each member being responsible for 8.2 mu of cultivated land. As a result of the labor shortage, this region is from 3 to 5 days or more later than other regions during the busy seasons of spring plowing, spring sowing, summer harvesting and summer planting. Thus, insufficient manpower is one of the region's prominent contradictions in agricultural production.

The whole region has a total of 25,000 plow oxen at the present time, and each one is responsible for approximately 22 mu. This is not a heavy burden in comparison with other agricultural regions.

This region has scored numerous achievements since liberation in development of farm machines, farmland water conservancy, production of chemical fertilizer and building of electric power facilities. Agricultural production conditions have steadily improved giving impetus to development of agricultural production. However, in an overall sense, the speed has not been fast nor levels high. In 1979, 1.65 million mu in the region was able to deliver a crop despite drought or waterlogging, and 800,000 mu produced consistently high yields, 33 percent and 16 percent, respectively, of the whole region's cultivated land. The industrial foundation is weak in the region, and the level of rural use of electricity is very low averaging only 3.2 kW per mu of cultivated land. The region has 2,284 tractors of mixed kinds, and 5,296 hand tractors. The actual machine-plowed area is 1.44 million mu, which is 29.1 percent of the cultivated land area. Chemical fertilizer use averages only 61.5 jin per mu figured in terms of cultivated land area. All the foregoing standards, except for the machine-plowed area, are very greatly lower than the average for the province as a whole. This is also a problem urgently in need of solution in this region's agricultural production.

The size of the burden on the work force and the extent of agricultural modernization have a direct bearing on the extent of land utilization. In 1979, the cultivation and reclamation index for the region as a whole was 17.7 percent, and the multiple-cropping index was 208 percent (including green manure). Though the cultivation and reclamation index is slightly higher than the average for the province as a whole, by contrast, the multiple-cropping index is lower than in other agricultural regions. The size of the multiple-cropping index is synonymous with the distribution of labor. In Xiajiang County, where the burden on the labor force is heavy, the multiple-cropping index is only 154 percent (including green manure). In 1979, the county grew 260,000 mu of early-crop paddy, but transplanted only 130,000 mu of late-crop paddy. In places like Ji'an City, Jishui and Wan'an counties, where the multiple-cropping index is relative high, it is still only approximately 170 percent. It should be particularly noted that only approximately 900,000-odd mu of reclaimable wasteland exists in this region. It is found in all the region's counties, quite a bit of it in continuous tracts. In addition, there is some abandoned farmland that has not been restored to use. These circumstances fully demonstrate that a very great potential exists for land utilization in this region, both through expansion of the cultivated land area and by increasing the multiple-cropping index. Doubtlessly, this will become an extremely favorable condition in future development of this region's agricultural production.

Second Section. Current Status and Characteristics of Agriculture, and Variations Within the Region

1. Current Status and Characteristics

A. Low Grain Yields Per Unit of Area; High Commodity Rate

A look at the structure of this region's agricultural production sector shows the farming industry to be the major production sector. Within the farming industry, grain crops hold first place. In 1979, 6.93 million mu were sown to grain crops. This was 67 percent of the area sown to farm crops. Among grain crops, paddy rice holds an absolutely dominant position. The area sown to paddy rice throughout the region is 6.4 million mu, or 92 percent of the area sown to grain. Next comes, soybeans, sweet potatoes and miscellaneous grains other than rice or wheat. Historically, this region's paddy production has been predominantly one crop of intermediate paddy, and one crop of late paddy. Since liberation, however, the growing of two crops of paddy has caught on very rapidly; however, a certain proportion of single-crop paddy is still grown, mostly in hill and downland regions where water conservancy conditions are relatively poor and burdens on manpower and animal power are fairly heavy.

A look at grain production levels shows this region's grain yields per unit of area to be far lower than other agricultural regions. In 1979, grain yields were 619 jin per mu of cultivated land, the lowest grain yields per unit of area of any region in the whole province. Except for Xin'gan and Wan'an counties plus Ji'an City, grain yields for the region as a whole averaged less than 700 jin per mu, and for Ji'an, Taihe, and Anfu, they were less than 600 jin. However, figured in terms of average per capita of agricultural population, this region's grain yields were higher than for any other region. In 1979, the region's gross output of grain was 2.64 billion jin, and it provided 786 million jin of commodity grain (including grain procured at negotiated prices) for a 29.8 percent commodity rate. Net outshipments of unprocessed commodity grain were 370 million jin, an interregion commodity rate of more than 14 percent. Commodity grain provided averaged 333 jin per capita of agricultural population, giving the region first place in the whole province. The commodity grain rate was highest for Xiajiang County at 41 percent. Its interregion commodity rate reached 24 percent, an average contribution of 690 jin per capita of agricultural population for first place in the whole province.

B. Major Provincial Citrus-Growing Region; Also Jute and Sugarcane of Interregional Significance

This region is currently the province's largest citrus-growing area. In 1979, it had 27,000 mu of orange grove area and output of oranges and tangerines was 243,000 dan. This was 12.8 and 37 percent, respectively, of totals for the whole province. The region has a long history in the growing of citrus fruit, and yields are both high and celebrated.

Xin'gan County alone has 16,800 mu of orange groves and produces 236,000 dan of tangerines and oranges annually. It has 62 percent of the region's growing area and 97 percent of its output. The yuan tangerines it produces have always been sold far and wide inside and outisde the province. Sanhu Commune in the main area producing tangerines and oranges is located in the Gan River valley where labor is plentiful. Its western part has the Yuanhui Canal for diversion of water for irrigation. Water conservancy conditions are relatively good, suiting the area both to the growing of oranges and tangerines, and suiting it to development of various kinds of cash crops as well, notably cotton. However, as tangerine trees have grown increasingly tall, some of them shade the ground to the detriment of cotton production. Tangerine and orange output and quality has also greatly declined. Competition between oranges and cotton for land, fertilizer and the labor force is sharp. In order to help revival and development of traditional tangerine and orange production, the cotton-growing area should be reduced. Soybeans may be intercropped in orange groves. Expansion of new orange groves should be into hills and downlands. This region also has a relatively large number of cash crops. In 1979 more than 730,000 mu was sown to cash crops. This was 7.1 percent of the total area sown to crops, the highest percentage after the north Jiangxi agricultural region, for second place in the whole province. Principal cash crops are rape, cotton, jute, sesame, peanuts and sugarcane, with rape occupying the largest area at more than 440,000 mu, or 60 percent of the growing area for cash crops. Rape is followed by sesame (3.6 percent), peanuts (10 percent), and cotton (8 percent). Though the growing area for jute and sugarcane is relative small, these crops have interregional significance as commodities.

Cotton is a cash crop developed after liberation. More than 99 percent of the growing area is concentrated in Xin'gan, Ji'an, and Anfu counties. Yields are currently very low as a result of problems with administration and management, production patterns, and technical measures. In 1979, yields of ginned cotton averaged only 36 jin per mu, very much lower than the average for the province as a whole. Cotton production today is a long way from being able to satisfy needs for development of cotton textile industries within the region. In any given year, the Anfu cotton textile plant located in this region is "unsated." It has no choice each year but to import a large quantity of ginned cotton from elsewhere, inside and outside the province. This region's natural conditions suit it to the growing of cotton. The alluvial sandy soil region on both shores of the Gan River is particularly well suited to the growing of cotton. If only appropriate actions are taken, high yields can be harvested. A look at the needs of this region's cotton industry shows proper development of cotton production to be necessary. However, it is currently most important to increase yields per unit of area, and the principle of "equitable distribution and equitable concentration" should be instituted in regional distribution. The cotton-growing area in Anfu and Ji'an counties, which are near the Anfu cotton textile plant should be expanded as feasible. Rotation of cotton and paddy rice as dryland and wetland crops should be gradually promoted to advance the growing of both cotton and grain for bumper harvests of both.

This region's jute output is second only to that of the northern Jiangxi agricultural region for second place in the whole province. In 1979, it occupied a 17,000 mu area, and gross output was 45,700 dan. This was 22 percent of the province's growing area and 15.2 percent of its output. In addition to being able to supply the jute needs of the Yongfeng jute textile mill within the region, it also helped out the Nancheng jute textile mill. Jishui and Yongfeng counties are the main jute-producing areas, accounting more than 90 percent of the total area of the region sown to jute. Commensurate technical measures should be adopted in the future for a vigorous increase in jute yields per unit of area.

This region is also the second most important sugarcane-growing region in the province. In 1979, 26,000 mu grew sugarcane, 88 percent of it in Taihe County. Though natural conditions in this region (particularly in Taihe County in the south) are suited to the growing of sugarcane, it is not grown as intensively as in southern and northern Jiangxi because population is small relative to cultivated land, and the average workload per worker is heavy. In addition, water conservancy conditions are relatively poor and the level of fertilization is also relatively low. As a result, sugarcane yields average only around 2½ tons per mu, lower than in the southern Jiangxi agricultural region. Sugar content of the sugarcane is also lower. However, this region has a high commodity rate for grain; soil resources are plentiful, and competition between grain and sugarcane for land is relatively slight. Therefore, vigorous development of this region's sugarcane production is not only imperative, but also possible. Taihe County, the main sugarcane-producing area in the whole province is now in process of building a large sugar refinery. After it has been built, this county's cane-growing area can be greatly increased.

C. Forestry, Animal Husbandry and the Fishing Industry Await Development

Forestry production is a relatively weak link in this region. The whole region contains 30.52 million m^3 of live tree reserves, and more than 50 million stalks of moso bamboo. Currently more than 300,000 m^3 of timber and more than 1.7 million stalks of bamboo are felled annually. The region's forested area is 34.8 percent of the total land area, and the forest cover rate is higher than for the Boyang Lake agricultural region in northern Jiangxi. This region's forests are found mostly in the Wugong Shan in Anfu County in the peripheral mountain region. Mostly only sparse and stunted masson pines and bushes grow in the vast hill and downland areas of the region. There are currently more than 5 million mu of barren mountains throughout the region awaiting afforestation. In many places, particularly Wan'an and southern Yongfeng counties, erosion is fairly serious, endangering agricultural production. Forestry policies must be instituted for large-scale afforestation of barren hills and mountains, for development of economic forests (such as tea oil and tea) in hills and downlands; and for large-scale growing of trees in the "four besides" in plains and areas in order to change this region's natural appearance as quickly as possible and accelerate development of forestry.

Since liberation, this region's animal husbandry and aquatic products industry have seen definite development. In 1979, the region had 976,000 hogs in inventory, 2.8 times the 256,000 head of 1949, making it a region of the province with a fairly slow level of increase. Today, the region averages just 1 hog per mu of cultivated land, which is lower than for all other agricultural regions. Moreover, variation is fairly great from place to place within the region. In Wan'an, Taihe, and Xingan counties, there are fairly good hog production bases, and development has been relatively fast. They have also provided many commodity hogs. The Kuanchao hog from Taihe County is a relatively superior local breed of hog. This region has a long history in the raising of livestock, and it has developed beef cattle production in recent years. Remarkable successes have been scored through importation of superior breed cattle and improvement of local cattle breeds. This region's widespread hills and downlands, its numerous grassy hills and grassy slopes, and its more than self-sufficiency in grain provide extremely superior conditions for development of animal husbandry production. Full future use should be made of these favorable conditions for vigorous development of hog and cattle raising to increase the proportion of animal husbandry in agriculture.

This region's fishing industry consists mostly of the rearing of fish in ponds, mountain pools and reservoirs. In 1979, the region's output of aquatic products was 94,000 dan. In recent years, the suburbs of Ji'an City have also developed suburban fish rearing. Active measures should be taken in the future for full use of existing water surfaces, for vigorous increase in yield per unit of area, and for greater production of fish to satisfy the needs of people living in cities and the countryside.

2. Variations Within the Region[1]

Though this region has a small land area, since natural and socioeconomic conditions vary, there is substantial variation in agricultural production within the region as well.

A. The central river valley plain, double paddy crop, cash crop, and citrus subregion: This subregion includes the Jitai Basin and the river valley plains of the middle reaches of the mainstream of the Gan River, as well as its tributaries, where landforms are primarily plains, low hills and downlands with a fairly low relative elevation. Cultivated land occurs in continuous tracts, and natural conditions are rather good. It is the agricultural region's main area for the growing of two crops of paddy and cash crops. Citrus production, which is of important

1 The boundary lines for the two subregions in this region do not follow county boundaries. As a result of factors having to do with statistical data and work maps, it is temporarily not possible to delineate them on an agricultural region map. A supplement can be provided once agricultural zoning work in the province has been launched.

interregional significance is also concentrated in Xin'gan County in the northern part of this subregion. A fairly large percentage of single-crop early intermediate paddy continues to be produced in places having fairly poor availability of water. Grain yields are fairly high, and the amount of commodity grain provided is large. The sandy soil on both shores of rivers is where most of the cash crops are grown. Mostly cotton, oil-bearing crops and jute are grown in fairly concentrated areas and are of definite commodity significance. Cotton is found mostly in the north; most of the jute is grown in the central part and the east, and most sugarcane and peanuts are grown in the south. At the present time, the farming system in the wetlands areas is mostly green manure (or rape)-early paddy-second crop of paddy. The main farming system in drylands is rape (or broad beans, peas, or green manure)-cotton (or jute or peanuts). Most areas practice crop rotation between wetlands and drylands.

Though this subregion's level of production is somewhat higher than for the agricultural region as a whole, as a result of water conservancy, labor force and fertilizer conditions, it is still a fairly long way from the levels of the province as a whole. Future emphasis must be on the building of water conservancy to surmount the threat posed by midautumn drought, flooding and waterlogging and such natural disasters; vigorous expansion of farm machinery to hasten mechanization and solve the problem of an overaly large burden on the labor force; active development of the raising of hogs, collection of hog manure and the growing of green manure to increase the amount of fertilization in order to improve the red earth low-yield fields; efforts to increase yields per uniot of area of paddy and of cash crops, with institution of the principle of "suiting general methods to specific circumstances: for regional crop patterns, shrinking the scattered growing area for cash crops (such as cotton), concentrating the growing area, and further increasing the commodity rate. Large tracts of wasteland slopes that should be used to the full are found on the low hills and downlands of this subregion. In addition to some gently sloping low hill drylands that may be developed as feasible for the growing of cash crops (such as peanuts), major efforts should be made to expand economic diversification as, for example, through the raising of hogs, cattle and goats. Hills and downlands may also be used to grow economic forests of tea oil and tung trees, plus firewood forests of masson pine and Schima superba. Places having requisite conditions may be also selected to develop citrus production. However, low winter temperatures in the north leave citrus crops open to freeze damage, so cold tolerant species should be selected.

B. The fringe hill and mountainlands single paddy crop, timber and bamboo, and tea oil subregion: This subregion includes periferal region hills and mountainlands that surround the central subregion like a ring. As a result of the lay of the land, pine, bamboo and tea oil production hold a fairly important position. Masson pine is most widespread, covering a fairly large area. The western and northwestern fringes, particularly the Wugong mountain region are the places in which the main timber forest bases in this agricultural region are located, and where China fir forests make up a definite proportion of the forests. The famed

Chen Shan wood is produced here. In the hills and mountainlands on the southern fringes, mostly tea oil, pine and bamboo are grown. Because of the limitations of climatic and socioeconomic conditions, this subregion's farming industry is fairly undiversified, and the single paddy crop growing area is fairly large. Hill region water conservancy conditions are fairly poor, so the percentage of intermediate-maturing early rice that is grown is substantial. Mostly the farming system consists of intermediate-maturing early rice-sweet potatoes (or late soybeans or buckwheat)-green manure. Where water conservancy conditions are better, the growing of two crops of paddy is gradually expanding. In mountain regions where the terrain is relatively high, mostly a single crop of late paddy is grown in a farming system of late paddy followed by green manure (or rape, or allowing the fields to lie fallow). In an overall sense, the level of agricultural production is fairly low in this subregion, and water conservancy projects must be developed here henceforth in an effort to change production conditions, change low-yield fields, and improve yields per unit of area. In low hill regions where conditions are suitable, the two-crop paddy-growing area may be gradually expanded. In mountain regions where heat resources are insufficient, vigorous efforts should be directed toward the promotion of hybrid rice so that single-crop paddy will overfulfill "The National Program for Agricultural Development." Forestry production in mountain regions should be intensified, pertinent policies put in place, the relationship between forests and grain handled correctly, and equitable planning done for the disposition of work forces. In mountain regions and in the Wugong Shan and Donggu Shan, where the proportion of timber is fairly high, a policy of taking forestry as the key link should be pursued with equitable felling for use, improvement of forest care and replacement, protection and increased propagation of forest resources. Active and effective actions must also be taken for rapid revival and development of tea oil production and the building of tea oil forest bases that produce consistently high yields.

Third Section. Several Problems in Further Development of Agricultural Production

1. Problems in Building Marketable Grain Bases

A. Analysis of Grain Production Levels and Potential

The Jitai Basin is the second largest commodity grain base in the province after the Boyang Lake Plain.[2] As compared with the Boyang Lake Plain commodity base, it has the following outstanding features in terms of level of grain production and potential for development:

1. Relatively small population in comparison with fields, and a large contribution to the country. This is the region in the province that averages the largest area of cultivated land relative to agricultural population. Each member of the work force is responsible for 1.83 mu

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2 Ji'an City provided no marketable grain, so it has not been included as part of this base.

more cultivated land than in the Boyang Lake commodity grain base. The proportion of grain it uses for the self-sufficiency is relatively small, and the amount of commodity grain it provides the country is large. In 1979, all eight counties in the region, but not including Ji'an City, each provided more than 75 million jin of commodity grain for a total of 780 million jin of commodity grain (including grain procured at negotiated prices), and a 29.8 percent commodity grain rate. Distribution was fairly balanced overall. Figured in terms of the average amount per capita of agricultural population, this was 333 jin per capita of commodity grain, very much more than the average for the Boyang Lake commodity grain base to take first place in the province.

2. The basis for farmland capital construction is poor, and yields per unit of area are low. This region's grain yields per unit of area are the lowest in the whole province. In 1979, grain yields per mu of cultivated land for the whole region were 257 jin lower than for the Boyang Lake commodity base. Main reasons were as follows: Existing farmland capital construction is poor, so the proportion of consistently high-yielding fields is small and standards are also not high. The work force carries a heavy burden, and levels of mechanization, fertilization and electric power supply are relatively low. Farming is relatively unintensive, and the multiple-cropping index is low. These characteristics show the tremendous potential for grain production of this region.

3. Plentiful land resources, and good conditions for all-round development of farming, forestry, animal husbandry and sideline occupation production. This region has a lot of usable barren hillsides; its soil resources are abundant, and there is little competition for land among farming, forestry, animal husbandry and sideline occupations. This is particularly favorable for all-round development of farming, forestry, animal husbandry, and sideline occupation production.

B. Measures for Setting the Course of Capital Construction

1. The main direction of attack should be on surmounting drought and flooding disasters by suiting general methods to specific circumstances in all-out efforts at farmland capital construction.

This region redeives copious rainfall, but its distribution is uneven. Nearly 50 percent of it is concentrated between April and June when northern and southern air currents clash, while only 17 to 22 percent falls between July and September when crops need it most, and then most of it comes as either torrential rains brought by typhoons or as local showers. This situation gives rise to natural disasters, notably serious drought but flooding and waterlogging as well. Consequently, the water conservancy problem is a major contradiction awaiting resolution in development of this region's agricultural production.

Though this region had a water conservancy project (Meipo in Taihe County) that supposedly irrigated 10,000 mu, the actual irrigated area was fewer than several thousand mu. There were extremely few other water conservancy projects, and agricultural production was essentially in a state of "relying on the skies for food to eat." Since founding of the nation, and particularly since 1958, water conservancy projects in this region have developed very greatly, so this situation has changed greatly. However, in an overall sense, the speed of water conservancy construction is fairly slow and standards are relatively low. Drought and waterlogging disasters continue to pose a serious threat to agricultural production, and drought disasters, in particular, afflict a wide area and cause much damage to as much as 500,000 mu or more. In 1963, 2.43 million mu were disaster stricken (not including Xin'gan County). This was more than half the basin's cultivated land, and grain output fell 440 million jin. In 1974, 770,000 mu were disaster stricken. This was 18 percent of the cultivated land area. Today the region still has an area of more than 1.1 million mu that is drought prone.

Apart from serious drought, areas along the region's rivers sustain fairly serious flooding and waterlogging. An area of 580,000 mu in the basin is prone to damage from flooding and waterlogging, and this brings damage to agricultural production in its train. In addition, the region has 280,000 mu of cold, pasty fields, 1.94 million mu of fields that are irrigated by channeling water along furrows or ladder-shaped irrigation ditches, and 1.48 million mu of eroded area. As a result of soil erosion, in some places "the land is higher than rivers."[3] This shows that large-scale construction of water conservancy to overcome drought and waterlogged disasters, to transform low-yield fields, and to expand the farmland area that produces consistently high yields, is a fundamental measure for hastening the building of commodity grain bases. Different measures will have to be used for the building of water conservancy depending on the topography of different areas as follows:

Hill and downland area water conservancy construction: Hills and downlands account for approximately two-thirds of the basin's total land area, and they are the areas of most serious drought. Water conservancy facilities are few and far between, and since some projects have not been fully equipped and the irrigation ditches are not completely intact, full advantages from irrigation cannot be derived. Action must be taken to derive the most benefit from irrigation in the near future. It has been calculated that were it possible to completely conclude work on all projects (ar more than 300 sites), the effectively irrigated area could be increased by 500,000 mu, and the area capable of delivering a crop despite drought or waterlogging could be increased to more than 800,000 mu. In addition, it is necessary to suit general methods to specific circumstances for vigorous construction of small-scale

3 Found mostly at 57 communes and 527 production brigades in Yongfeng, Jishui, Taihe, and Wan'an counties in the southern part of the basin. Along some stretches of the En River in Yongfeng, the river bed is already hire than the field. Water and drought disasters are frequent to the impairment of agricultural production.

reservoirs and pond dams for full storage of water. Small reservoirs and dammed ponds are most useful in impounding local runoff for local irrigation, and are suited for use on hill and downland farmlands. Moreover, it requires small investment for fast results, and should be energetically developed. When full use of local runoff is still unable to satisfy irrigation demands, large and medium projects for the impounding of water will have to be built in the upper and middle reaches of mountain regions to divert water from elsewhere. A water conservancy system in the shape of a long vine with melons here and there for holding water may be used to transfer water from surplus to shortage areas for genuine solution to irrigation problems in hill and downland areas.

Water conservancy in river valley plains areas: River valley plains are the main location for this region's cultivated farmland, and drought, flooding and waterlogging are likewise the main threats to agricultural production in these areas, the drought problem being most prominent. All-round planning must be done and general methods suited to specific circumstances for development of projects for impouding, diverting and lifting water. Some river valley plains fringe areas having topographical conditions for building medium and small water conservancy facilities should plan construction of water conservancy projects as needs require. Places lacking topographic conditions for the storage of water should develop projects for the diversion of water. Farmlands on both shores of river valleys have favorable conditions for development of irrigation projects. In lowland areas on both sides of the Gan River and in the lower reaches of its tributaries, flooding and waterlogging disasters are natural factors obstructing development of agricultural production. The building since liberation of reservoirs in the upper and middle reaches of various streams, and the building of more than 50 protective dikes totaling nearly 300 km in length on both sides of streams in the lower reaches has provided tremendous benefits for defense against floods. However, because of the building of these flood dikes, river water levels have risen, with the result that it has become difficult to drain water away within the region, and some waterlogging disasters have ensued for some low-lying farmlands. Over the years, actions have been taken to drain waterlogging from areas prone to waterlogging, with establishment of six waterlogging drainage stations with an 800 kW installed capacity and 93 sluice gates to drain waterlogging. This has reduced disasters from water stagnation and waterlogging on 190,000 mu of cultivated land. However, in an overall sense, standards to guard against flooding and to drain waterlogging are still very low, and the threat from flooding and waterlogging remains very great and requires action. On the one hand, there has been an increase in height and a strengthening of existing flood-protection dikes. At the same time, new flood-prevention dike projects have been built for medium and small cities and towns, as well as for low-lying plains areas that currently have no flood-prevention projects but that have had numerous flooding and waterlogging disasters over the years. In waterlogging areas in Ji'an City, and in Taihe County, as well as in Ji'an, Jishui, Xiajiang, Xin'gan, Yongfeng, and Wan'an counties along both shores of the Gan River

or in lowlands in the lower reaches of tributaries, drainage ditches and flood drainage ditches have been dug, and waterlogging drainage stations and sluice gates have been put in place as part of a gradual solution.

In short, water conservancy projects for this region should proceed from realities, and have as their main thrust solution to natural drought and waterlogging disasters to achieve unified planning and a comprehensive tackling of mountains, water, fields, forests, and roads. Relationships among mountainlands, hills and downlands, and river valley plains must be watched, and a good job done of basin planning.

2. Vigorous development of farm machines for genuine solution of the problem of an overworked work force.

Under present production conditions, the size and quality of the labor force is an important element affecting the size of agricultural production. When natural conditions are similar, the quantity and quality of the labor force per unit of cultivated land area is clearly in direct proportion to the level of grain production. In this region, the burden on the work force is heavy and the level of grain production is relatively low. If this region's level of agricultural production is to be increased rapidly, the problem of an overworked labor force must be genuinely solved.

(1) Establishment of a strict production responsibility system, and good performance in labor management.

(2) Suiting general methods to specific circumstances, and equitable readjustment of crop patterns. In order to overcome the labor shortage during the busy seasons in farming that results in delays in crop seasons and impairs yields, proceeding from realities entails need to arrange the sequencing of crops. In plains areas having fairly plentiful work forces, late-maturing varieties may be somewhat more numerous. In hill regions where labor is relatively short, early-maturing varieties are somewhat more suitable.

(3) Vigorous development of farm machinery to reduce the load on labor. This is one of the region's in the province with a fairly weak farm machinery industry. In order to hasten development of this region's agricultural production and build this region rapidly into a commodity base within the province, major assistance from the state to the extent possible is extremely imperative. When departments concerned apportion farm machinery, they should bear in mind that this region has many mu of fields, a shortage of labor and provides a large amount of commodity grain, so the quantity of farm machinery supplied should be appropriately increased. Development of farm machinery requires the suiting of general methods to specific circumstances. River valley plains and low hill regions are suited to development of fairly large horsepower tractors, emphasizing the large, the medium and the small. Hill and mountain regions are suited to development of small hand tractors. Right now,

emphasis should be placed on development of building and repair plants for farm machinery, and a three-tier county, commune and brigade repair and manufacturing network should be set up to solve problems involved in matching of farm machines and implements and in their repair to make full use of the role of farm machinery facilities.

3. A firm grip on early rice while directing the main attack against the late crop in a major effort to increase yields per mu.

Major efforts to raise yields per unit of area is the first task in hastening the building of the region's commodity grain bases and in assuring high yields for the year as a whole. Today early paddy and late crop production levels are very uneven from one county to another and between one commune or brigade and another, or they even vary greatly under identical conditions, thus demonstrating the very great potential for increased yields. The area sown to early paddy throughout the region accounts for 60 percent of the total area sown to paddy, and early paddy accounts for 70 percent of total output, so early paddy must be taken in hand first. At the same time, however, everything possible should be done to build water conservancy, to expand sources of manure, to expand the growing area for late crops, and to increase yields per unit of area energetically. This holds important significance for winning high grain output for the year as a whole.

Vigorous transformation of low-yield fields is one of the actions to be aaken for improving yields per unit of area of both the early paddy and late paddy crops. This region has a very large and very widespread low-yield field area. Take Taihe County, for example, In 1978, 107 of the 354 production brigades in the county, or approximately 30 percent, had yields of less than 400 jin per mu. The existence of many low-yield communes and brigades hurts efforts to increase grain yields per unit of area, and exerts a drag on agricultural output for the whole region. Effective action must be taken to change quickly the backward situation of low-yield fields. In mountain and hill regions, "one ridge and three ditches," must be the rule; the "four fields" (namely, three running fields, deeply plowed fields, cold pasty fields, and stagnant water fields) must be tackled; the "five waters" (namely ground water, mountain flood waters, furrow irrigation water, internal stagnant water, and cold pasty waters) must be eliminated, and level terraced fields must be built. Plains areas should carry out the building of garden-style fields, overhauling ditch systems, eradicating irrigation dead spots, separating drainage and irrigation systems, increasing fertilization and building consistently high-yield fields.

4. Actively set the stage for reclamation of wastelands to expand the cultivated land area.

This region has abundant land resources. Incomplete statistics show it as having more than 5 million mu of barren mountains and wastelands suitable for forests, animal husbandry, and farming, 900,000 mu of it

being wasteland that can be cleared for use. More than 50,000 mu of it is wasteland in fairly large continuous tracts. Some areas have a certain amount of abandoned farmland that has yet to be put to use. An overwhelming majority of the wasteland has a gradient under 15 degrees, and conditions for its development and use are superb. All-round planning of farming, forestry and animal husbandry should be done in accordance with needs for building modern agriculture to make full use of it.

Reclamation of wasteland entails following the principles of comprehensive planning for all-round use. Different measures for development and use must be based on conditions and characteristics of each place. In mountain regions, hills and downlands, reclamation must be linked to water and soil conservation, and particular attention should be devoted to proper handling of the relationship among farming, forestry and animal husbandry so that they complement each other. Steep mountain slopes should be developed primarily as China fir timber forests; low hills and uplands should be developed mostly for tea oil. Attention must also be given development of firewood forests and water and soil conservation forests. Before low hill wastelands are reclaimed, they may be used to produce green manure and fodder for many years. This holds extremely great significance in the expansion of sources of fertilizer, and for promotion of animal husbandry through the raising of hogs, cattle and goats.

2. Problems in the Use of Low Hill, Downlands, and Barren Slopes

Low hills and downlands are the main types of landforms in this agricultural region. They cover an area of somewhat more than 9,000 sq km (or more than 13.5 million mu) which is about 50 percent of the total land area. Up until liberation, this type of land was extremely little used. Its vegetation cover was destroyed, and erosion was serious. Following liberation, and particularly during the 1960's, as farming and forestry reclamation efforts developed, this type of land gradually began to be used. Establishment of a group of state-owned land reclamation farms and forest farms made considerable headway. However, because of natural and socioeconomic conditions, this land is still not used to the full, and a substantial potential for use exists. An overwhelming preponderance of this region's more than 900,000 mu of wasteland is wasteland slopes on low hills and downlands. Moreover, most of the agricultural production done by communes and brigades located in downlands is currently relatively undiversified, with earnings from grain production frequently amounting to between 80 and 90 percent of total income. Avenues for production are not very broad, and income from economic diversification and sideline occupations is very slight. As a result of the destruction of vegetation cover, some downlands are eroded, and they seriously lack fuel, fertilizer or fodder. Consequently, full use of low hill and downland wastelands requires the suiting of general methods to development of economically diversified forestry and animal husbandry production. This is an extremely important task in this region's development of agricultural production.

A. Types of Wasteland and Conditions for Use

So-called low hills and downlands consist mostly of low hills (with an absolute elevation of less than 300 m, and a relative elevation of between 50 and 200 m), high downlands (with an absolution elevation of less than 100 m and a relative elevation of between 30 and 80 m), and low downlands (with an absolute elevation of less than 100 m and a relative elevation of less than 30 m). Calculations made from the 1:500,000 "Terrain Map of Jiangxi Province," show the low hill area to be approximately 77 percent, the high downland area 21 percent, and the low downland area only 2 percent (See Table 6-3). The main kinds not being used at present are low hills and high downlands. On the basis of similarities in height of topography, gradient, soil characteristics and plant cover, the low hills and downlands of this agricultural region may be divided as follows: red soil downlands, purple shale low hills, red sandstone and red conglomerate low hills.

1. Red soil downlands. With a relative elevation of between 20 and 50 m, and a 5-20 degree slope, most are of red earth developed out of dyktyonic red soil mother material. They have a thin soil layer and their organic matter content is fairly low (See Table 6-4). The soil is relatively clayey with a pH of 4-4.5, and vegetation cover averages 50-60 percent. Grass and shrubs grow well on middle and lower slopes, where the cover rate may reach more than 80 percent. This type of wasteland slope is found mostly on both sides of the Gan River and its tributaries, and it is suitable for development of forestry and for animal husbandry, mostly the raising of cattle and goats). Gently sloping land at the foot of slopes may be interplanted with forests and grain.

2. Purple shale low hills: Relative elevation is 50-60 m, and gradient is from 10 to 20 degrees. Purple soil predominates. It is powdery with a neutral or slightly alkaline pH running from 7 to 7.5. Soil fertility is relative high, and it is rich in phosphate and calcium. It is not suited to the growing of tea oil or masson pines. Vegetation cover averages 50 percent. There is only a relatively small area of this type of wasteland slope, and it is found mostly at Xinwei, Beiyuan, and Taihe in Ji'an County. It is suitable for the growing of pulses and tung trees.

3. Red sandstone and conglomerate low hills: Relative elevation is 80 to 100 m and slope ranges from 15 to 25 degrees. It is red earth developed out of red sandstone and conglomerate, which shows an acid reaction, the pH being 4.5-5.5. The soil is gravely and fairly heavy; and the vegetation cover rate runs between 40 and 60 percent. The area of this kind of wasteland slopes is very large. It is found in tracts on the fringes of the Jitai Basin, and is suitable for development of firewood forests and water and soil conservation forests. Economic forests may be planted at the foot of slopes.

Table 6-3. Statistics on Low Hill, High Downland, and Low Downland Area of the Central Jiangxi Agricultural Region

Area: Sq km

项目 a)	县市 b)	c) 吉安市	d) 吉安	e) 吉水	f) 峡江	g) 安福	h) 永丰	i) 泰和	j) 万安	k) 新干	l) 合计
m) 低丘岗地合计	面积 n)	62.91	1056.16	1471.82	870.20	922.12	1237.29	1267.51	736.92	504.84	9029.80
	%	100	100	100	100	100	100	100	100	100	100
o) 低丘	面积 n)	/	1317.52	951.17	437.21	824.13	1096.40	1116.34	736.92	216.55	6746.24
	%	/	67	65	56	89	89	88	100	43	75
p) 高岗	面积 n)	62.91	638.64	475.59	297.01	97.99	140.89	123.48	/	270.82	2107.33
	%	100	33	32	34	11	11	10	/	54	23
q) 低岗	面积 n)	/	/	45.06	85.98	/	/	27.72	/	17.47	176.23
	%	/	/	3	10	/	/	2	/	3	2

r) 资料来源：据《江西省地貌图》（1/50万）量算

Key:
- a) Particulars
- b) County or city
- c) Ji'an City
- d) Ji'an
- e) Jishui
- f) Xianjiang
- g) Anfu
- h) Yongfeng
- i) Taihe
- j) Wan'an
- k) Xin'gan
- l) Total
- m) Total for low hills and downlands
- n) Area
- o) Low hills
- p) High downlands
- q) Low downlands
- r) Source of data: Calculations based on "Terrain Map of Jiangxi Province," (1:500,000)

Table 6-4. Analysis of Soil Fertility of Wasteland Slopes of Downlands and Hills in the Central Jiangxi Agricultural Region

a) 土壤名称 / b) 项目	c) 分析项目				h) 地点
	有机质 (%) d)	水解性N e) (%)	速效性P_2O_5 f) (mg/100g±)	g) 速效性K_2O (mg/100g±)	
i) 网纹红土性红壤 (岗顶)	0.02	0.001	0.25	16.70	p) 吉安县庙前公社
j) 网纹红土性红壤 (坡腰)	1.67	0.003	0.50	24.40	p) 同上
k) 网纹红土性红壤 (坡脚)	4.03	0.013	0.50	21.50	p) 同上
l) 紫色土	2.40	0.010	7.00	10.30	q) 吉安县固江公社
m) 红砂岩低丘红壤	0.03	0.001	0.20	20.60	r) 吉安县北源公社
n) 花岗岩低丘红壤	0.88	0.005	0.25	6.75	s) 万安县弹前公社
o) 变质岩低丘红壤	3.45	0.010	0.25	7.75	t) 吉安县天河林场

u) 资料来源：南京地理所编《江西省吉安专区农业区划调查报告》1965.12

Key:
- a) Name of soil
- b) Particulars
- c) Analysis particulars
- d) Organic matter (%)
- e) Water soluble nitrogen (%)
- f) Quick acting P_2O_5 (mg/100g±)
- g) Quick acting K_2 (mg/100g±)
- h) Location
- i) Dyktyonic red earth (tops of downlands)
- j) Dyktyonic red earth (midlevel on slopes)
- k) Dyktyonic red earth (foot of slopes)
- l) Purple soil
- m) Red sandstone low hill red earth
- n) Marble low hill red earth
- o) Metamorphic rock low hill red earth
- p) Miaoqian Commune, Ji'an County
- q) Gujiang Commune, Ji'an County
- r) Beiyuan Commune, Ji'an County
- s) Tanqian Commune, Wan'an County
- t) Tianhe forest farm, Ji'an County
- u) Source of data: "Agricultural Zoning Survey Report, Ji'an Administrative Region, Jiangxi," December 1965, Nanjiang Institute of Geography

In addition, there are a small number of low hills made of granite (at Tanziqian in Wan'an County) and metamorphic rock (at Fumin, Shiqi, and Guantian in Ji'an in Xiajiang County, which are suitable for development of economic forests.

B. Direction of and Measures for Use

To summarize the natural features of the above several kinds of low hill and downland wasteland slopes, except for a small number of low downlands on which conditions are good and the soil relatively fertile, provided other conditions (such as a work force and water conservancy) are in being, planned reclamation for development of grain or certain cash crops can be done. The direction of use of most wasteland slopes on downlands and hills, however, should be predominantly forestry and animal husbandry. First of all, a look at natural conditions shows soil quality to be fairly poor and soil fertility poor on most of these kinds of wastelands, a situation unfavorable for farming. In addition, water is extremely lacking on hills and downlands, which are extremely prone to drought, and where construction of water conservancy projects is often fairly difficult. Until such time as water conservancy conditions have improved, ill-advised reclamation would not only be of no benefit, but would intensify soil erosion dramatically with serious consequences. Second, this is an agricultural region with a large amount of land relative to population. The work force carries a heavy burden. In low hill and downland regions, in particular, the burden on the work force is heavier. The main problem with agricultural production is low yields per unit of area. Were the cultivated land area to be expanded ill-advisedly, this would inevitably increase the burden on the work force. Under current circumstances of a fairly low level of mechanization, this would lead to nonintensive farming that would adversely affect an increase in yielms per unit of ares. Full use of low hills and downlands for energetic development of forestry and animal husbandry is not only necessary for this region's development of agriculture, but is also suitable in terms of natural conditions.

In the development of forestry, economic forests, firewood forests, and water and soil conservation forests would be most suitable. Economic forests should be mostly tea oil, followed by tung trees and Chinese chestnut trees. Tea oil trees are particularly fond of acidic soil; they are strongly adaptable, and they can be grown on all the various kinds of wastelands in this region with the exception of purple shale. They grow best at the foot of slopes, on concave slopes, and in mountain cols, and should be vigorously developed there. Yongfeng, Taihe, Wan'an, and Anfu currently have a fairly large area growing tea oil and a fairly good foundation. They should make sure to nurture and renew their tea oil forests, assign work forces in an equitable manner, and make vigorous efforts to increase yields per unit of area. Because the plant cover on the downlands and hills of this agricultural region has been destroyed for a long period of time, erosion has occurred, and this has given rise to difficulties for the masses in finding firewood. A survey shows that the masses in quite a few communes and brigades frequently travel several tens of li away to fetch firewood, a great waste of manpower. In some communes and brigades, 25 percent of even more of the total number of the labor force's workdays are spent gathering firewood. This has a very adverse affect on agricultural production. Therefore, in addition to more closing off of mountains to grow forests, there must

be vigorous development of firewood forests and of water and soil conservation forests. Most of the wasteland slopes of this region are suitable for development of firewood forests and water and soil conservation forests. Fuel-short communes and brigades in Ji'an, Gaihe, Wan'an, Yongfeng, Xiajiang, and Xin'gan counties should consider, first of all, afforestation with tree species suited to the region such as masson pines, Schima superba, Chinese sweetgum [Liquidambar taiwania], chinaberry, paulownia, and white oaks. They may also grow shrubs such as Vitex cannabifolia, shrub lespedeza [Lespedeza bicolor], Asiatic sweetleaf [Symplocos paniculata], and Alnus cremastogyne.

In addition, places having requisite conditions should select continuous tracts suitable for use as pasturelands, set up permanent livestock farms, and develop cattle-raising bases. Most of the wasteland slopes on the low mountains and downlands of this region grow fine-quality pasture grasses, and the masses have historically been in the habit of pasturing their plow oxen on them. However, they are not being fully used at all right now, and potential is very great. Active measures must be taken for vigorous development of a cattle-raising industry. Particular attention should be directed to beef cattle production to meet foreign export needs. In eroded areas where plant cover is sparse, pasture grasses such as sweet clover, shrub lespedeza, kudzu vine and Verbena officinalis may be grown for development of animal husbandry through the growing of cattle, goats and rabbits.

In addition, in places where fertilizer is in fairly short supply, but work forces are fairly adequate, sweet clover, tiesaozhou [6993 2217 1590], sesbania, and Tagetes erecta may be grown. These perennial kinds of green manure grow fast, tolerate drought, produce a lot, and are highly effective as fertilizers.[4] They hold great significance for expanding sources of fertilizer, and for hastening the greening of barren mountains. It should be pointed out that the aforementioned perennial green manures also make very good livestock fodder, and the nutrient value of both shrub lespedeza and sweet clover is very high. As part of the improvement of low-yield red earth fields should be vigorous development of hog raising. Not only can this supply large sources of fertilizer for agricultural production, but it can also make a greater contribution to the country and increase commune member earnings.

4 Shrub lespedeza may be cut once or twice each year. Its young plants contain 0.98 percent nitrate, 0.25 percent phosphate, and 0.47 percent potash. The nitrate fertilizer contained in 100 jin of the young stalks and stems of shrub lespedeza is equivalent to 5 jin of ammonium sulfate; the phosphate fertilizer content is equivalent to that of 1 jin of calcium superphosphate; and the potash fertilizer content is equal to that of 5 jin of grass and wood ashes. It makes a fine green manure. Shrub lespedeza stalks have a 42 percent water content, a 5.04 crude protein content, a 2.57 percent crude fat content, and a 14.59 percent crude fiber content, making it a fine livestock fodder as well.

Tapping of potential, and equitable assignment of work forces are key measures in making full use of the wasteland slopes of low hills and downlands. Surveys show the months of January, February and June to be relatively slack periods for downland and hill region communes and brigades. Spare time in winter may be used to prepare the land, to dig holes and to plant trees for afforestation. The ½ month following transplantation of early rice and weeding of grain fields, and during the 10 days preceding the double rush in harvesting one crop while planting another may be devoted to tending and caring for tea oil economic forests. Practice has shown this to be an important measure for moderating the competition for labor and time in the use of wasteland slopes and other agricultural production. Second, management of existing commune and brigade forest (and livestock) farms should be improved, policies diligently instituted, and everything done truly well. All-round planning of farming, forestry and animal husbandry should be a springboard for suiting general methods to specific circumstances to set the course of operations. In addition, establishment of models, improvement of technical guidance, training of technicians, development of scientific experiments, and summary and promotion of advanced experiences are also extremely important measures.

Chapter 7. South Jiangxi Mountainland and Hill Forest, Grain, Sugarcane, and Fruit Agricultural Region

This agricultural region is located in the south of the province. Its eastern boundary is the Wuyi Shan, which separates it from Fujian Province. In the extreme south lies the Jiuling Shan, which forms the boundary with Guangdong Province. To the south and southwest are the Zhuguang Shan and the Dayu Ling, which neighbor Hunan and Guangdong provinces. Administratively this region encompasses not only Ganzhou City, Ganxian, Nankang, Xinfeng, Dayu, Shangyou, Chongyi, Anyuan, Longnan, Dingnan, Quannan, Ningdu, Yudu, Xingguo, Ruijin, Huichang, Xunwu, Shicheng and Guangchang counties in the Ganzhou Administrative Region, but Suichuan in the Ji'an Administrative Region as well, for a total of 20 administrative units. Land area totals 43,800 sq km, or 26.3 percent of the total province. This includes a 6.43 million mu cultivated land area, or approximately 17 percent of the total for the province as a whole. Population totals 6,679,000 of which the agricultural population numbers 6,037,000, or approximately 22 percent of the total for the province as a whole (in 1979). This is a forest and farming region with a large population relative to farmland in which grain output is able only to provide self-sufficiency, and in which forestry as well as the growing of cash crops, such as sugarcane, tobacco, and various kinds of hemp, hold an important place in the province, and in which potential for the growing of fruits such as tangerines and oranges is great.

First Section. Agricultural Production Conditions

1. Large Mountainland Area and Complex Topography

Division of the whole region in terms of types of landforms shows a 56 percent mountainland area, a 41 percent hill area, and only a 3 percent plains area (including some downlands plus water surfaces). This is the agricultural region in the province with the greatest percentage of mountainland and hill area. The region's topography is high all around and low in the middle, and the river system converges on the center like spokes of a wheel. Mountainlands ring the area, and hills stretch through its middle. The area in between is punctuated with countless, variously formed, red basins of unequal size. The topography of the whole region may be divided into three parts (See Table 7-1).

Mountainlands: This region's mountainlands cover a vast area of more than 24,400 sq km, or 40 percent of the total mountainland area in the whole province. Mostly they are formed from a metamorphic rock system or granite. Elevation above sea level is fairly high, most mountains being between 1,400 and 1,700 m high, with individual peaks exceeding 2,000 m. Lima peak in Suichuan County on the border of Hunan Province reaches 2,120.4 m, making it one of the highest mountains in the province. This vast mountain region with high peaks and precipitous slopes, deeply cut river valleys, weathering crust, and a fairly well maintained cover of vegetation, is one of the province's major forest areas. Wetlands in

the gorge valleys of the mountain region are mostly sinkhole fields. Since field plots are small, their slopes steep, the length of sunshine they receive short, and both moisture and temperature low, increase in farm crop yields is difficult.

Hills: Elevation above sea level is between 200 and 500 m for hills, and most of them have been formed from metamorphic rock and granite. Hills formed from metamorphic rock have fairly steep slopes, narrow ravines and the mountain landscape is fairly lofty. Inasmuch as granite mostly intrudes along fracture zones in granite rock hills and has been subsequently eroded and laid bare, a conglomeration has formed. In such regions, the weathering crust is very well developed, and in places where vegetation has been destroyed and the natural balance has been lost, erosion is serious. The fields in hill regions are mostly ridge fields and streamside fields, most of which produce low yields. Hills and mountain slopes are good places for development of economic forests, and currently many places are growing tea oil, tea and citrus fruits.

Basins and river valleys: The orientation of both basins and mountain ranges is generally northeast by southwest, and their structural lines are identical. Preliminary statistics show nearly 50 basins that have been formed in various ways, the most important of which are the Ganzhou Basin, the Yudu Basin, the Xinfeng Basin, the Ningdu Basin, the Ruijin Basin, the Guangchang Basin, the Shicheng Basin, the Huichang Basin, and the Chijiang (Dayu) Basin, of which the Ganzhou Basin is the largest, covering more than 1,500 sq km. Within basins the land is flat and is traversed by rivers. On both shores of the rivers lie broad plains. Usually on each side of streams are third- or fourth-grade river valley terraces, and first- and second-grade terrace lands on which the land is flat and broad, suiting it to mechanized farming. The soil is fertile and the soil layer is fairly thick. Proximity to sources of water makes irrigation easy, and most of the land has been developed as paddy fields, which are known as flat fields in this region. This is an important area for grain and cash crops of the southern Jiangxi region. The lay of the land is fairly high in third- and fourth-grade terraces, most of which have been cut into downlands and low hills having fairly infertile soil and few irrigation facilities. They are prone to drought. Most of them are not currently used to the full, and some grow only some masson pines.

This region's soil has been affected by its mother material, climate, topography and human activities. Cultivated soil is very complex, and its distribution follows a definite pattern. In mountainlands and hills are found mostly yellow clay fields, zhugan [3727 5139] soil fields, yashini [7700 1452 3136] fields, and cold waterlogged fields. In river valley plains are found mostly sandy clay fields. The fairly fertile black clay fields are found mostly near cities, towns, villages and hamlets. Coarse sandy soils are found mostly in places that have been severely eroded. In addition to the aforementioned wetland soils, there are also mountainland and hill dryland soils, such as yellow clay soil, red sandy

Table 7-1. Statistical Table on Types of Terrain in Each County of the Southern Jiangxi Agricultural Region

a) 县、市	b) 土地面积 (平方公里)	c) 山地		d) 丘陵				e) 平原(包括水面和部分岗地)	
		f) 面积	g) 占土地面积%	h) 高丘面积	g) 占土地面积%	i) 低丘面积	g) 占土地面积%	f) 面积	g) 占土地面积%
j) 全区合计	43832.0	24405.0	55.7	12137.4	27.7	6059.6	13.8	1235.0	6.0
k) 中部副区	20843.0	9334.0	44.8	5981.6	28.7	4292.4	20.6	1235.0	6.0
l) 赣县	3472.0	1319.0	38.0	1232.8	35.5	746.2	21.5	174.0	5.0
m) 南康	1846.0	498.0	27.0	393.4	21.3	547.6	29.7	407.0	22.0
n) 大余	1367.0	875.0	64.0	311.7	22.8	57.3	4.2	123.0	9.0
o) 信丰	2877.0	806.0	28.0	1011.7	35.2	772.3	26.8	287.0	10.0
p) 兴国	3215.0	2025.0	63.0	595.0	18.5	595.0	18.5	/	/
q) 于都	2893.0	1273.0	44.0	590.1	20.4	1029.9	35.6	/	/
r) 瑞金	2449.0	1176.0	48.0	773.5	31.6	255.5	10.4	244.0	10.0
s) 会昌	2724.0	1362.0	50.0	1073.4	39.4	288.6	10.6	/	/
t) 西北部副区	6880.0	5440.0	79.1	895.9	13.0	544.1	7.9	/	/
u) 遂川	3138.0	2197.0	70.0	623.6	19.9	317.4	10.1	/	/
v) 上犹	1545.0	1112.0	72.0	219.4	14.2	213.6	13.8	/	/
w) 崇义	2197.0	2131.0	97.0	52.9	2.4	13.1	0.6	/	/
x) 东北部副区	6946.0	3440.0	49.5	2896.2	41.7	614.6	8.8	/	/
y) 宁都	3753.0	1764.0	47.0	1697.4	45.2	291.6	7.8	/	/
z) 广昌	1611.0	822.0	51.0	466.0	28.9	323.0	20.1	/	/
aa) 石城	1582.0	854.0	54.0	732.8	46.3	/	/	/	/
ab) 南部副区	9163.0	6191.0	67.6	2363.7	25.8	608.5	6.6	/	/
ac) 寻乌	2312.0	1572.0	68.0	490.7	21.2	249.3	10.8	/	/
ad) 安远	2374.0	1472.0	62.0	890.7	37.5	11.3	0.5	/	/
ae) 龙南	1641.0	1280.0	78.0	111.1	6.8	249.9	15.2	/	/
af) 定南	1316.0	697.0	53.0	619.2	47.1	/	/	/	/
ag) 全南	1520.0	1170.0	77.0	252.0	16.6	98.0	6.4	/	/

[Key for Table 7-1 on previous page]

Key: a) County or city
b) Land area (sq km)
c) Mountainlands
d) Hills
e) Plains (including water surfaces and some downlands)
f) Area
g) Percent of land area
h) High hill area
i) Low hill area
j) Total for the whole region
k) Central subregion
l) Ganxian
m) Nankang
n) Dayu
o) Xinfeng
p) Xingguo
q) Yudu
r) Ruijin
s) Huichang
t) Northwest subregion
u) Suichuan
v) Shangyou
w) Chongyi
x) Northeast subregion
y) Ningdu
z) Guangchang
aa) Shicheng
ab) South subregion
ac) Xunwu
ad) Anyuan
ae) Longnan
af) Dingnan
ag) Quannan

clay soil, and purple clay soil. Natural soils in mountainlands show a pattern of zonal distribution that varies with elevation above sea level. Going from bottom to top, the progression is from reddish yellow earth to mountainland yellow earth to mountainland yellowish brown soil.

2. Superior Light and Heat Conditions and Fairly Copious Rainfall

This region lies close to the Nanling at a fairly southern latitude. This is one of China's major demarcation lines for climate. The striking feature of the region's agricultural climate is fairly warm winters with high effective cumulative temperature, a long frost-free period, copious rainfall, and a fair amount of moisture all year round. This is a fine place for development of economic diversification through forestry, paddy rice, sugarcane, tobacco and citrus fruits.

Light energy conditions: This region receives a substantial amount of solar radiation. In Ganzhou, total radiation averages 111.3 kilocalories per sq cm per year. Between April and October, total radiation averages between 8.2 and 15.0 kilocalories per sq cm per month. From November to March the following year, total radiation also averages 5.9 to 7.1 kilocalories per sq cm per month. (See Table 7-2)

Table 7-2. Average Total Amount of Radiation in Ganzhou, 1960-1978
Units: Kilocalories/sq cm

a) 月 份	1	2	3	4	5	6	7	8	9	10	11	12	全 c) 年
b) 总辐射量	6.1	5.9	6.7	8.2	10.6	10.8	15.0	14.0	11.4	9.2	7.1	6.2	111.3

Key: a) Month
b) Total radiation
c) Whole year

Distribution of sunlight resources shows very great variations in this region. Average total amount of sunshine for the year is 1,482-1,978 hours for a sunshine rate of between 34 and 44 percent. The Chongyi mountain region receives least. The province champion is Huichang with the most. (See Table 7-3)

Table 7-3. Statistical Data on Climate for Representative Counties in the Southern Jiangsu Agricultural Region
Units: °C, mm, Hours, Days

a) 代 表 县	b) 平 均 气 温			c) 极端气温		d) 10℃ 积 温			e) 年降平水均量	f) 日照时数	g) 无霜期
	h) 年温	i) 一月	j) 七月	k) 最高	l) 最低	m) 初日	n) 终日	o) 积温			
p) 广 昌	18.1	6.2	28.6	39.6	−9.8	19/3	24/11	5692	1744	1825	273
q) 兴 国	18.9	7.2	29.3	39.4	−5.2	14/3	30/11	6030	1502	1929	285
r) 遂 川	18.6	6.8	29.4	39.7	−6.6	16/3	28/11	5904	1429	1727	291
s) 赣 州	19.4	7.9	29.4	41.2	−6.0	12/3	2/12	6189	1431	1905	284
t) 崇 义	17.9	7.0	26.9	38.0	−8.0	14/3	25/11	5617	1636	1482	307
u) 会 昌	19.3	8.1	28.6	39.5	−6.7	8/3	1/12	6170	1637	1978	279
v) 信 丰	19.5	8.2	29.1	39.4	−4.1	9/3	4/12	6253	1528	1774	296
w) 龙 南	18.9	8.2	27.6	37.4	−6.0	7/3	5/12	6096	1519	1770	281
x) 寻 乌	19.0	8.[illegible]	27.1	38.2	−5.5	7/3	6/12	6054	1672	1816	280

[Key for Table 7-3 on previous page]

Key: a) Representative counties
b) Average temperature
c) Extremes of temperature
d) Cumulative temperature at 10°C or above
e) Annual average amount of precipitation
f) Number of hours of sunshine
g) Frost-free period
h) Mean annual temperature
i) January
j) July
k) Maximum
l) Minimum
m) First day
n) Last day
o) Cumulative temperature
p) Guangchang
q) Xingguo
r) Suichuan
s) Ganzhou
t) Chongyi
u) Huichang
v) Xinfeng
w) Longnan
x) Xunwu

Heat conditions: This region's average annual temperature is from 17.9-19.5°C. During January, the coldest month, average temperature is 6.0-8.5°C. During the hottest month of July, the average temperature is 26.9°-29.4°C. This is the agricultural region in the province in which the variation in annual temperature is least. However, differences in temperature between plains and mountains are considerable. In mountain regions, temperature generally tends to be low, and particularly so in Chongyi County. In this region, the lowest winter temperature is from -4.1° to -9.8°C, and highest temperature is from 37.4° to 41.2°C.

This region has between 251 and 275 days during which the average temperature is stable at 10°C or above, and cumulative temperature reaches between 5,500° and 6,253°C, a difference of approximately 750°C between the two. This is to say that if a daily summer temperature of 30°C is used, there can be a seasonal difference of approximately 25 days. Thus, mountain region farming systems and matching of varieties must be different than on the plains. It is for this reason that an old peasant adage says, "One zhang higher, and it is not the same," and "There is a great difference between the sunny and snady sides of slopes."

Moisture conditions: This region receives an average 1,129-1,744 mm of precipitation annually. The precipitation process is subject not only to the effects of the "motionless peaks of the Nan Ling," but is

also prone to the effects of typhoons. In addition, summer thunderstorms also occur in mountain regions. Consequently, precipitation is seasonally fairly well distributed, which helps farm crop growth.

Looked at from the angle of the province as a whole, this region's agricultural climate resources are most superior and varied. Nevertheless, every year varying degrees of low temperatures, waterlogging, flooding and drought occur.

Spring cold: The spring sowing season comes early in this region. The first day on which the average daily temperature stabilizes at 10°C comes between 7 and 19 March, with Guangchang being latest. However, spring cold causes damage in some years, and seedlings frequently rot. The years 1961, 1965, 1970 and 1978 were such years. During 1970, in particular, a whole month of low temperatures and overcast, rainy weather occurred from 26 February to 26 March when rotting of seeds and seedlings was extremely severe.

Floods and waterlogging: Most of the flooding and waterlogging in this region comes from mountain torrents. Summer flooding during May and June, and autumn high water caused by typhoons around August are particularly noteworthy. Since precipitation is concentrated, the terrain high, and forest cover slight in some places, mountain torrents generate quickly in the wake of torrential rains and cause damage. Major floods occurred during 1952, 1955, 1961, 1962, 1964, 1968 and 1976. Between April and June 1962, in particular, total precipitation in Ganzhou reached 978 mm, which was approximately 70 percent of total rainfall for the year. Streets along the river in Ganzhou had water 2 chi deep, and numerous fine fields were drowned. Again in the autumn of 1961, typhoons constantly affected southern Jiangxi occasioning autumn mountain torrents.

Drought: Drought may occur year round in this region, but damage from spring drought and midautumn drought is greatest. Drought years were 1962, 1963, 1965 and 1966, and the spring droughts of 1962, 1963 and 1965 were standouts. Water was lacking to grow seedlings or to transplant them. During these 3 years, total precipitation from January to March was less than 188 mm, and 1962, in particular, had the least with only 72 mm. During the midautumn drought of 1966, total precipitation from July to the first 10 days of October was only 114 mm. The drought was serious.

Low autumn temperatures: The average dates on which low autumn temperatures occur in this region are from 30 September to 13 October. How early low autumn temperatures occur in any given place is extraordinarily closely related to terrain and topography. In general, they occur early in mountain regions and late on plains and in basins. In term s of counties, it occurs earliest in Chongyi and latest in Ganzhou. In Xunwu County in 1965, it arrived from the end of the first 10 days to the middle 10 days of October. Powerful cold air currents cause cold, dry, north winds to blow for days on end that seriously hurt the late crop and reduce yields.

3. Plentiful Forest Resources and Waterpower Energy Resources, and Numerous Mountain Forest Specialties Benefit Agricultural Diversification

This region is a part of the subtropical broadleaf evergreen forest zone. Temperatures are moderate all year round; rainfall is copious; the growing season is long; soil is fertile; plant cover is dense, and forest resources are extremely plentiful. A 1975 survey of forest resources showed 51 million mu used for forestry in the region, and a 52.4 percent forest cover rate. This included 31,347,000 mu of forest area, or 61.5 percent of the total; 21.18 million mu of sparse forest area, or 4.1 percent; and 24.72 million mu of scrub forest area, or 4.8 percent. In addition, there was a 919,000 mu immature afforested area, or 1.8 percent of the total. The unforested area was 14,145,000 mu or 27.8 percent of the total. The region's live timber reserves totaled 92,298,000 m^3, or approximately 35 percent of the total for the province. There were 233,714,000 stalks of moso bamboo. Principal forest trees were masson pine, China fir, camphor, phoebe nanmu and evergreen chinquapin. There were, in addition, economic forests of tea oil, tung and tea. The vast mountain regions also produce large amounts of mountain forest specialities, and forest sideline products for export such as mushrooms, wood fungus, native paper, rosin, tung oil and coir fiber. All this provides a beneficial avenue for all-round development of economic diversification.

Since this region is located in the upper reaches of the Gan River, water conservancy (and waterpower) are extraordinarily plentiful. In addition to the Gan River, which is the largest river in the region, there are more than 6,000 other large and small rivers and creeks in the region, 12 of which are fairly large rivers. The Shangyou River and the Zhang River converge to become the Zhang River (with a basin area of 7,419 sq km). The Ping River, the Mei River, the Qin River, the Jin River, the Lian River, and the Tao River converge to form the Gong River (with a 26,500 km basin area). The Zhang and Gong rivers converge at Ganzhou to form the Gan River. Statistics show the average annual runoff in Ganzhou Prefecture for many years to have been 32 billion m^3, yet agriculture currently uses fewer than 2 billion m^3, or only 6.3 percent of total annual runoff. Thus, potential for development of water conservancy is still substantial. This region has plentiful waterpower, reserves amounting to 920,000 kW. Future prospects for development of small hydroelectric power stations are bright.

The region also has substantial mineral resources to make chemical fertilizer. An example is the coal in the Zhishan coal seam. Though not large in area, and though reserves are not large, the coal is not far below the surface, so communes and brigades can mine it using indigenous methods. It plays a definite supplementary role in solving the fuel shortage problem faced by rural villages everywhere in this region. By contrast, limestone is found widely, mostly in Xingfeng, Yudu, Ruijin, Huichang, Longnan, Dayu and Xuwu counties where reserves amount to approximately 900 million-odd tons. Most of the lime made in rural limestone kilns today is used as fertilizer to improve the red

earth. Phosphate limestone is a raw material for the production of phosphate fertilizer, and is found mostly at Xijiang and Xiaomi in Longnan and Huichang counties. Reserves amount to approximately 400,000 tons. In addition, there are scattered deposits of peat, which is used as a raw material for making ammonium humic acid, which is a highly effective fertilizer. Substantial amounts of potassium feldspar, fluorite and pyrite also occur.

4. Large Population Relative to Cultivated Land; Serious Soil Erosion and Mine Pollution; Earnings of the Masses at a Low Level

A large population relative to cultivated land is an important feature of this region's socioeconomic conditions. In 1979, farmland averaged only slightly more than 1 mu per capita of agricultural population in the region, and each member of the agricultural work force served an average of fewer than 3 mu of cultivated land. Both were lower than the average for the province as a whole. Despite abundant natural resources for agriculture and an abundant work force that is beneficial for all-round development of economically diversified farming, forestry, animal husbandry, sideline occupations and the fishing industry, plus meticulous care of farmland; nevertheless, the long proportional imbalance among farming, forestry and animal husbandry, the overcutting of forests, and the destruction of plant cover have created extremely serious erosion. This is particularly true of some of the counties in the middle and northeastern parts of this region where in many places there are bald mountains and infertile fields. Every year the masses must invest a large amount of labor in the control of soil erosion and in solving problems of fertilizer, fodder and fuel needed for production and daily life. In addition, this region is also one of the country's largest nonferrous metals mine bases. There are a relatively large number of industrial and mining enterprises in the region, and though they help agricultural production in many ways by providing electric power and transportation facilities, as well as develop commune and brigade enterprises, the three wastes (waste water, waste gas, and industrial residues) from industrial and mining enterprises are also disadvantageous to agriculture in many ways. First of all, they pollute farmland, impairing crop growth. In particular, the water that carries tailings from mines pollutes water sources with the result that crops will not grow new roots, the root systems turn black or rot, leaves shrivel and curl or develop black spots, and finally wither and die. Dayu County has reported that tailings have polluted more than one-half its cultivated land area. Second, mine tailings are discharged into rivers, causing the river beds to rise over the years. During the period immediately following liberation, 15-ton junks could ply the waterways of the Zhang River. Today a bamboo raft finds the going difficult. The rise in river beds impedes the discharge of floodwaters, thus seriously threatening agricultural production. Third, plow oxen are affected to the detriment of agricultural production. Tailings water contains arsenic. When plow oxen drink this water or eat polluted grass, they become poisoned or even die. Fourth, it hurts human health. Chemical tests show rivers to contain arsenic compounds that exceed by 50 times the health standards

for drinking water, and that seriously impair human health. For the foregoing various reasons, the rise in this region's agricultural production has been seriously impaired, and quite a few places have even increased production for no increase in income. In 1979, net income from collective distributions for rural people throughout the region averaged only 66.10 yuan per capita, and grain rations averaged only 487 jin per capita, both of which were far lower than the average for the province as a whole.

5. Low Level of Agricultural Modernization and Rather Congested Transportation

Since the founding of the People's Republic, this region has gone from zero in its agricultural modernization endeavors and has now developed very much. However, in comparison with other agricultural regions, it is relatively low both in speed of development and existing levels. The region has a total of 423,200 horsepower (as of 1979) of farm machines of all kinds, or an average of only 659 horsepower per 10,000 mu of farmland, which is only slightly more than one-half the average for the province as a whole. The machine-plowed area is less than 15 percent of the cultivated land area; and electric power consumption is only slightly more than 7 kWh per mu of farmland, the lowest anywhere in the province. Chemical fertilizer use averages only 65.8 jin per mu of cultivated land, slightly higher than for central Jiangxi, but lower than the average for the province as a whole. These matters require further rapid development.

Since this region is located in the remote southern part of the province, mountains are high and valleys numerous, and transportation has always been relatively blocked. There are currently fewer than 100 km of forest railroads; most rivers are also upper reaches so water transportation conditions are relatively poor, and transportation depends mostly on railroads. Substantial development of this region's railroad transportation has occurred since liberation, the current distance open to traffic being 11,300 km (1977) for an average 0.26 km per square kilometer. Though this is higher than the average for the province as a whole, in an overall sense, this region's communications and transportation industries are fairly weak and far from able to meet the needs of agricultural production, particularly development of forestry production. This state of affairs must be changed as quickly as possible, and vigorous efforts made to develop this region's communications and transportation.

Second Section. Current Status and Characteristics of Agriculture, and Variations Within the Region

1. Current Status and Characteristics

A. Definite Growth of Grain Production, but Fairly Low Level of Self-Sufficiency

Grain production, consisting of paddy rice for the most part, is the main farming industry of this region. The area sown amounts to approximately 69 percent of the total area sown to farm crops. Grain crops other than paddy rice are sweet potatoes, broad beans and peas, wheat and soybeans, the area sown to which totals approximately 8 percent of the total, with sweet potatoes accounting for 4.2 percent. Since the founding of the nation, this region's grain production has increased substantially. Gross output of grain increased from 1.513 billion jin in 1949 to 4.287 billion jin in 1979, a 1.8-fold increase. Yields per unit of area also rose from 261 jin per mu in 1957 to 448 jin per mu in 1979 (figured in terms of planted area), a 72 percent increase. A look at the regional pattern of grain production shows uneven development, however. At Ganzhou in the central area, in all the counties of the Yudu Basin, and in all the counties of the northwest, where population is large relative to cultivated land and farming is done intensively, yields per unit of area have been fairly high, but speed of increase in gross output has been slow. Most counties are still not self-sufficient in grain, or else the level of self-sufficiency is very low. However, at Ningdu, Guangchang and Shicheng in the northeast, and at Huichang and Xunwu counties in the southeast, where population is small relative to cultivated land and where production conditions are relatively poor, despite relatively low yields per unit of area, increase in gross output has been relatively fast, and a substantial amount of grain is shipped elsewhere. However, in an overall context, grain production is still not commensurate with development of the national economy or population growth. In 1979, Xingguo, Yudu, Nankang, Longnan and Shangyou counties alone brought in 117 million jin of unprocessed commodity grain from elsewhere. Since the level of self-sufficiency in grain is low, not only did this directly impair any increase in the people's standard of living, but also had a bad effect on this region's development of cash crops as well as forestry, animal husbandry, sideline occupations and fishery production. Active measures must be taken to increase grain output quickly in order to promote development of the national economy.

B. Fairly Good Foundation for Cash Crop Production, but Patterns Still Irrational

This region is one of the province's traditional cash crop areas. In 1979, the region had 776,000 mu growing cash crops, which was approximately 6.2 percent of the area sown to farm crops. Principal cash crops are peanuts, rape, sugarcane, tobacco and jute. Sugarcane, peanuts and flue-cured tobacco hold first place in the province in both growing area and output. In addition, white lotus from Guangchang County, and red melon seeds from Xinfeng County have been grown in this region for a long time and have long enjoyed a reputation in international markets as traditional specialists. Chinese herbal medicines such as rhizome of oriental water plantain [Alisma plantago aquatica var.orientale], yam, scurfy pea [psoralea corlyifolia], and tuber of dwarf lilyturf [Ophiopogon japonicus] also hold a certain position within the province. Thus, rapid development of this region's cash crop production holds extremely great significance.

1. Peanuts and rape: Peanuts are a traditional oil-bearing crop of this region, which is also a major peanut-producing area of the province. The area planted is large and yields are high. In 1979, a 267,000 mu area was planted. This was 38 percent of the province's peanut-growing area, and gross output was almost half the total for the province. The main producing areas are located in sandy drylands on both shores of the Gan River and its tributaries, particularly in Xinfeng, Nankang, Yudu, Ningdu, and Xingguo counties, each of which grows more than 20,000 mu. This region has both early and late peanuts. Early peanuts are usually sown sometime between the vernal equinox and "Qingming" [around 5 April], and are harvested between "great heat" [about 23 July] and the "beginning of autumn [about 7 August]. Late peanuts are usually sown or intercropped between "Qingming" and the "grain rains" 20 April, and are harvested between the autumnal equinox and "cold dew" [about 8 October]. Both early and late peanuts are rotated with paddy rice. Superior natural conditions, plentiful experience in growing peanuts, and a rational system of crop rotation between wetlands and drylands accounts for this region's consistent relatively high yields per unit of area. In 1979, the region averaged yields of 221 jin per mu, 48 jin higher than the average for the province as a whole. With full-scale institution of all rural economic policies, this region's peanut production will develop further. The rape-growing area accounts for around 25 percent of the region's cash crop-growing area, which is second only to peanuts. In 1979, yields averaged 54 jin per mu, less than the average for the province as a whole. Rape is grown in every county in the region, but is found particularly in Yudu, Ningdu, Ruijin and Ganxian counties.

2. Sugarcane: According to an account in QIMIN YAOSHU [CANON OF THE QI PEOPLE], "Yudu County has fertile soil suitable for the growing of sugarcane." Clearly, this region has a more than 1,500-year history in the growing of sugarcane. During the period of the War of Resistance to Japan, this region expanded the growing of sugarcane to more than 200,000 mu. Later on, flooding of the market with foreign sugar caused the bankruptcy of rural cane growers, so that on the eve of liberation all southern Jiangxi had only 83,000 mu of cane fields remaining. After liberation, the situation in sugarcane production underwent rapid change. By 1979, the region had 169,000 mu in cane.[1] This was 60 percent of the province's total canefield area, and it produced 66 percent of the province's gross output of sugarcane to become a major centralized cane-growing area in the province. This area is found mostly in Nankang, Ganxian, Xingguo and Ruijin counties, plus Ganzhou City, each of which has more than 10,000 mu of canefields. Five mechanized sugar refineries are located in the previously mentioned counties and city. They have a total daily crushing capacity of more than 4,000 tons. Nankang and Ganxian counties are old cane-growing areas in which the canefield area amounts to more than 50 percent of the total for the

1 Sugarcane growing is concentrated mostly in Ganzhou Prefecture. In 1979, the sugarcane-growing areas of Suichuan County amounted to only 20 mu; thus, the outputs and area are for Ganzhou Prefecture.

province. Moreover, Ruijin and Xingguo counties are canefield areas that have newly developed since liberation, each county hasing nearly 20,000 mu. All the other counties in the region also grow sugarcane; however, most are producing areas that use native crushing methods.

This region's natural conditions are extremely favorable for growing sugarcane. Specifically, heat resources are plentiful; the frost-free period is long, and the period of continuously low temperatues is short. Not only can the sugarcane grow perennial roots and be planted in fall and winter, but it can safely overwinter as well. During October, temperatures begin to drop gradually in this region, and rainfall decreases markedly during this time as well. Both events help accumulation of sugar in the cane. The decrease in rainfall between the middle 10 days of October and the first 10 days of December helps the cane reach maturity. Most canefields are found in sandy soil along the banks of rivers (with some in hill lands), where the soil is fertile. This, plus a fairly dense cane-growing area population that provides fairly plentiful labor, is advantageous for intensive farming. This region's sugarcane yields per unit of area are still not high today. In 1979, yields for the region as a whole averaged 6,163 jin per mu. Though more than 500 jin higher than the average for the province as a whole, yields have yet to return to the 1965 level when they were 6,577 jin per mu. Policies must be further carried into effect; management must be improved, and advanced farming techniques must be adopted for rapid rise in this region's sugarcane production.

3. Tobacco: This region's superior climate and soil conditions, as well as its abundant experience in production techniques has made it the province's most important tobacco-growing area. In 1979, the region grew 52,000 mu of tobacco, which was approximately 6.7 percent of the area sown to cash crops. The region has a fairly short history in the growing of flue-cured tobacco. Test plantings began in 1956, but now more flue-cured tobacco is grown than sun-cured tobacco. Flue-cured tobacco has gradually come to occupy a leading position. In 1979, 28,000 mu was planted to flue-cured tobacco in the region. This was 87 percent of the total for the province. Output reached 31,000 dan, which was 90 percent of the total for the province. Tobacco is grown fairly universally in every county of the region, but growing is mostly concentrated in Xinfeng, Ruijin and Huichang counties. A particularly large amount is grown in Xinfeng, where the growing area is 12,000 mu. Growing of sun-cured tobacco is concentrated primarily in Yudu, Guangchang, Anyuan and Shicheng counties, which produce 24,000 dan annually. "Black old tiger" sun-cured tobacco from Guangchang and Shicheng are renowned at home and abroad, and it is exported as a raw material for the manufacture of cigars. Sun-cured tobacco from Anyuan is mostly red tobacco, which is also a superior domestic variety. During the past more than 10 years, failure to institute economic policies has resulted in tobacco farmers everywhere reporting few benefits from the growing of tobacco. Growing area and output have fallen in consequence. Flue-cured tobacco production, in particular, is a long way from the all-time

high. In order to meet needs of the national economy and the people's livelihood, full future use will have to be made of the plentiful experience of this region in the growing of flue-cured tobacco and of the advantages it offers for high yields. Economic policies will have to be conscientiously put in place, the procurement price raised appropriately, and conflicts resolved in the competition for land, labor, and fertilizer between grain and flue-cured toabcco production. Positive actions will have to be taken for suitable expansion of the area of flue-cured tobacco and vigorous efforts made to increase both yields per unit of area and output.

4. Jute and cotton: This region is one of the province's major jute-growing areas. In 1979, jute was grown on 16,000 mu, which was 20 percent of the jute-growing area in theprovince, making this region second in the province to the northern Jiangxi agricultural region. Production is concentrated mostly in Nankang and Ganxian counties. Since water, soil, light and heat conditions are fairly good here, yields per unit of area are higher than for northern Jiangxi. Most places practice wetland and dryland crop rotation between jute and paddy rice. This helps increase soil fertility, reduce weeds, diseases and insect pests, and produce high yields of both jute and paddy. Communes and brigades in which there is little competition for land between jute and grain should be selected for expansion of production as feasible. This region has a small cotton-growing area. In 1979, it grew 23,000 mu of cotton, which was only 1.5 percent of the province's cotton-growing area. Yields per unit of area are generally low except in a small number of communes and brigades such as Chatan Commune in Chongyi County. Furthermore it competes for land, fertilizer and labor with grain and other cash crops. A look at the overall situation in the province in accordance with the principle of "rational crop patterns and proper concentration" suggests that this region should grow more sugarcane, tobacco, peanuts and other cash crops. The cotton-growing area should be suitably reduced, energies concentrated, the experiences in concentrated cotton growing of Chantan Commune in Chongyi County promoted, management strengthened, and cotton grown scientifically for vigorous increase in yields per unit of area from existing cottonfields.

5. White lotus and red melon seeds: These are traditional specialties of the region and are major export products. Though the growing area is not large, they hold important economic significance. White lotus is found mostly in the area around Xiaosong in Shicheng County, and in the Yiqian area in Tongjiang and Guangchang where the soil is sandy loam and slightly acidic. Guangchang has a long history in the growing of hollow white lotus, which sells readily throughout the country. Guangchang has been termed "lotus land." Red melon seeds are found in Xinfeng County. Formerly Ningdu and Yudu counties also grew them, but growing has been limited to Xinfeng County in recent years. As a result of the interference and destruction caused by the ultraleftist line of Lin Biao and the "gang of four," some places one-sidedly emphasized grain production, regarding white lotus and red melon seeds only in terms of competing for land, fertilizer and labor, and without realizing either

the economic significance of, or export trade need for, white lotus and red melon seeds. As a result, both growing area and output of white lotus and red melon seeds declined. This should arouse serious attention. Practice has demonstrated that so long as the relationship between grain and cash crops is handled correctly, the "three competitions" [for land, labor and fertilizer] can be solved. Practice of a crop rotation system of white lotus-rhizome of oriental water plantain-and double crops of paddy, or of white lotus-rape-double crops of paddy, or of white lotus-Chinese milk vetch-double crops of paddy, pretty well resolves the "three competitions" between grain and lotus. Stabilization of the white lotus growing area at around 20 mu for yields of more than 100 jin per mu, with simultaneous growing of grain, oil-bearing crops, medicinal herbs has produced increased yields.

6. Tea: This region's tea production also holds an important position in the province. Most of the tea produced is green tea, and the "Gougunao" that Tanghu Commune in Suichuan County produces is famed throughout China and the world. Today, this region's tea-growing area is found mostly in Xinfeng, Shangyou, Suichuan, and Dayu counties. In 1979, the region had 129,000 mu of tea plantation area, which produced 15,000 dan of tea. This was 14 and 8 percent, respectively, of the total for the province. This region has a large mountainland and hill area in which climatic conditions favor growth of tea shrubs. The labor supply is plentiful, and potential for development of tea production is great, particularly in the "three souths." In prefectures like Anyuan, climatic conditions favor the growing of large leaf Yunnan tea plants, whose leaves are large and thick and thus suitable for processing into broken black tea for sale abroad. This should be vigorously promoted and developed. Currently, a firm grip should be taken on the buildup of existing tea plantations, strengthening of management, institution of scientific tea farming, and efforts to produce high yields of superior quality tea.

7. Fruits and medicinal materials: The region currently has 38,000 mu of fruit orchards, or 12 percent of the total for the province. Thanks to superior climatic conditions, yields per unit of area are fairly high and gross output amounts to 23.2 percent of the total for the province as a whole. Orchards are found mostly in Ganxian, Xinfeng, Yudu, Xunwu, Xingguo, Ruijin, Suichuan, Nankang and Ningdu counties. Frut varieties include oranges and tangerines, pears, pomelos, peaches and persimmons. The growing area for oranges and tangerines is fairly large at 32,000 mu, which is 84 percent of the fruit orchard area. Virtually every county grows them, those devoting a large area to them and producing fairly high yields being Xunwu, Xinfeng, Anyuan and Xingguo counties. Xingguo sweet oranges (also known as Guang oranges) have been grown for a long time. Their fruit is firm; they are juicy, and they have a delicious flavor. They are neither too sweet nor too sour, and they have an appealing shape and color. Consumers in China and abroad like them very much. This region's orange and tangerine production has developed very rapidly in recent years, output rising from 8,000 dan in 1965 to 114,000 dan in 1979. Numerous counties have successfully

promoted the growing of seedless Wenzhou honey oranges. Anxi Horticultural Farm in Xinfeng County has also successfully test planted navel oranges imported from abroad. This farm, which was established in 1970, planted its trees in 1 year. The trees bore fruit in 3 years and made a contribution in 4 years. Within 7 years, the farm showed a profit. Today it has become an orange and tangerine export commodity base, exporting mostly navel oranges. Suichuan County is one of China's three old kumquat-growing areas (the other two are at Zhenhai in Zhejiang Province and at Tong'an in Guangxi), and it has a more than 900-year history of growing them. Quality is superb and output is large. In 1979, output approached 10,000 dan, most of which were processed into kumquat cookies locally for sale elsewhere. In addition, Nankang and Ganxian counties also produce pomelos. Pears and peaches are found in all counties.

This region is a new one in the province for development of orange and tangerine production. Since it is located close to the southern subtropical zone, climatic conditions are extremely favorable for subtropical evergreen fruit trees such as oranges and tangerines. During winter, in particular, there are not likely to be freezes such as those to which northern and central Jiangxi are prone. In addition, this region has a large area of low hills and downlands, which takes up about 15 percent of its total land area and which is currently not being generally used to the full. Thus, it is the region in the province where conditions for growing oranges and tangerines are best and where the potential is the greatest. In Xinfeng and Yudu in the central part of the region, and in Xunwu County, Anyuan County, and the "three souths" in the southern part of the region, in particular, conditions are most outstanding. Positive action must be taken to form orange and tangerine base counties in the near future.

Attention must be devoted to several problems in development of orange and tangerine bases in view of this region's natural conditions as follows: First, demand for oranges and tangerines is fairly great, but this region receives fairly scant rainfall between July and September. Large area orange and tangerine bases will require irrigation, so consideration must be given to water supply and general methods suited to specific circumstances for the building of mountain pools and reservoirs to solve irrigation problems during the day season. Second, erosion is serious in many counties in this region. Development of orange groves in hill regions will require the building of contour reverse-slope terraced fields to reduce soil erosion, and to improve orange and tangerine capabilities to resist drought. Third, since hills and downlands are generally fairly infertile, have a low organic content, poor soil structure and are highly acidic while oranges and tangerines require a soil pH of 6-6.5, lime will have to bs used to balance out and reduce acidity. In addition, when building orange and tangerine bases a complete road n-twork will have to be considered so that tangerines and oranges may be shipped at once after harvesting. In addition, attention must be given to the building of shelter forest zones.

Chinese medicinal herbs are also an important traditional product of this region. Scurfy peas and rhizome of oriental water plantain from Guangchang, and yam from Ruijin have been grown for a rather long time, and enjoy a certain reputation in markets both inside and outside the province. Other herbs include the dried rhizome of rehmannia [Rehmannia glutinosa], the tuber of dwarf lilyturf, yuanhu [0337 5170], and the root of Zhejiang figwort [Scrophularia oldhami]. Rhizome of rehmannia from Yunnan, Astraotylis Lancea Formalyrta var. Sojutsu from Zhejiang, root of herbaceous peony [Paeonia lactiflora] from Anhui, Panax pseudoginsen from Yunnan, and gingseng from Jilin, all of which were introduced during the mid-1950's have been successfully grown in this region. Today the growing area for Chinese herbs covers approximately 20,000-odd mu, about half of which is in the mountains where it does not occupy farmland. Since this region has many mountains and hills, it has very great potential for the growing of local medicinal herbs and for the introduction of herbs from other provinces. Positive action must be taken in the future to expand the growing area as feasible even while working vigorously to increase yields per unit of area.

C. Development of Forestry Production; Fairly Large Potential for Exploitation of Mountainlands

Because of its superior environmental conditions for production, this region has extremely plentiful forest resources, and it is one of 18 major forest areas in the whole country. It annually provides the country with more than 500,000 m^3 of marketable timber, and 2 million stalks of moso bamboo, plus a large quantity of forest sideline products and mountain forest specialties. The output value of forestry is between 8 and 9 percent the gross output value of agriculture for the region, and development of forestry holds major significance for the region, the province, and for the country alike.

This region's forest resources consist mostly of timber forests. Classified by forestry habitat, they are approximately 80 percent timber forests. Classified in terms of forest reserves, they are 86 percent timber forests. Counties in the region having forest reserves of 5 million m^3 or more include Chongyi, Anyuan, Suichuan, Huichang, Xunwu, Xinfeng, Longnan, Ningdu, and Quannan. Those having 3 million m^3 or more include Ruijin, Dayu, Shangyou and Quannan. In forests regions located in Chongyi, Shangyou and Suichuan counties, most of the trees are China firs of superior quality. This is the growing area for the famous "guanshang wood," and it annually ships nearly 100,000 m^3 of marketable timber.

Tea oil is this region's major economic forest tree. It is grown on a wide area, making this region the champion of all agricultural regions in the province in tea oil production. Incomplete statistics show a current tea oil forest area of approximately 5 million mu, which is more than one-third the total for the province. Tea oil is grown in virtually every county, and an especially large amount is grown in Xingguo, Suichuan, Huichang, Shangyou, Ganxian and Nankang counties. Xingguo and

Suichuan counties alone account for a more than 1.6 million mu, which is almost one-third the total for the whole region. However, in many mountain areas growing tea oil today, output is not high as a result of failure to tend the trees, and because forests are old and lie in waste. Yields average only 5-odd jin per mu. Vigorous efforts must be made at revival and renewal to increase yields per unit of area. Still other economic forests are tung and plam. The tung-growing area is about 24,000 mu and is located mostly in Ganxian, Yudu, Anyuan and Huichang counties. In addition, olive trees, Acacia decurrens and pines from abroad are grown here and there in the region. Most were introduced after 1974. The olive tree preserve consists of only slightly more than 30,000 trees. Acacia decurrens trees are an important source of raw materials for tannin. Those grown in Kunming are rather well suited for transplanting to this region, particularly to places such as Yudu and Xinfeng counties where they grew well because of fairly high temperature. This region has also introduced lac insects, but they do not overwinter well for the most part. It is necessary to send people outside the province each year to bring in lac insects.

Since the founding of the nation, much has been done to build up this region's forestry production. Now the region is operating a large group of state-owned farms for forest felling and growing, afforestation forest farms, and commune and brigade forest farms. During the past 30 years, nearly 20 million mu have been afforested, 50 percent of which is a preserve area. Timber output has likewise increased very greatly. According to incomplete 1979 statistics, timber output for the whole region reached 80,000 m^3, which was approximately one-third of the province's total timber output. Marketable timber provided to the country amounted to more than 700,000 m^3, or nearly 60 percent of the total amount of timber that the province provided the country. A group of advanced models who did much afforestation, have a large preserve area, and who administer and manage well have appeared on the forestry front. One example is the Xiaoyedong Forest Farm located in Quannan County, which has afforested more than 220,000 mu since its founding in 1954, including 130,000 to 140,000 mu of artificially afforested China fir forest. Thanks to good care and management, the trees now have a girth of 30 to 40 cm, and emphasis has turned from forest management to felling. It has become the major timber forest for fir wood in the region. The Gaocha Forest Farm in Chongyi County is yet another noted advanced model on the forestry front for the whole province.

Nevertheless, overall the present state of this region's forestry production and development of forestry are still a long way from meeting needs in building the national economy. Many places emphasize felling while slighting afforestation in forestry production, or even engage in reckless cutting and denudation. As a result, forest resources that might be provided for development and use are becoming increasingly scarce. In selection of tree species for afforestation, and in planning ways of preparing the land and deciding on sites to establish forests, some places have been unable to suit general methods to specific circumstances, suit specific kinds of trees to specific kinds of land,

or build forests scientifically. As a result many places have failed in their efforts to build forests, and the working people have lost money. In forest enterprises, problems exist everywhere with low levels of administration and management, low timber utilization rates and great waste. The region still has more than 10 million mu of barren mountains suitable for forests that have not yet been afforested. Some seriously eroded areas, in particular, remain barren hills and mountains to the serious detriment of agricultural production. Positive actions must be taken to find solution to all these problems.

D. Fisheries and Animal Husbandry Have Developed, but Commune and Brigade Enterprises Have Fairly Weak Underpinnings

Production from this region's fishing industry comes predominantly from breeding. Fish are reared mostly in mountain pools or reservoirs, and some places are in the habit of rearing fish in paddyfields. In 1979, the region had a fish breeding water surface area of only slightly more than 360,000 mu, and gross output of aquatic products amounted to less than 200,000 dan. Despite fairly great development since the period immediately following the founding of the nation, it is still not possible to satisfy people's needs within the region. Fishing industry production has developed fairly rapidly in this region, and it has a good foundation, notably in several counties in the central basin. Output from Yudu, Nankang, Ruijin, Xinfeng, Ganxian and Ningdu counties, plus Ganzhou City amounts to almost 70 percent of gross output from breeding in the whole region. In some remote mountain regions, neither catches nor breeding amount to much, and it is rather difficult for the masses to get fish to eat. In Ruijin County where production from the fishing industry has taken hold fairly rapidly, the pool, pond and reservoir breeding area totals 23,000 mu, and every commune in the whole county has ponds and pools for rearing fish. Formerly fish fry were shipped in from Jiujiang, but an aquatic products institute has now been established in the county so the county is able to breed its own fry. In addition to satisfying the county's own needs for stocking bodies of water, it is also able to provide fry to other regions and to places outside the province. Since it has resorted to measures for purification of breeds and selective breeding of fine varieties, fish fry resistance to disease has risen, and yields per mu have markedly increased. Yields of fresh fish for the county as a whole average more than 100 jin per mu. The county now stocks waters not only with black carp, grass carp, silver carp and variegated carp, but also with African crucian carp. Since these crucian carp reproduce rapidly and produce fairly high yields, they currently account for 40 percent of the fresh fish output in the entire county.

This region's animal husbandry has developed rather slowly. In 1979, the region had 1.63 million head of live hogs in inventory versus 381,000 head in 1949 for a 3.3-fold increase. This is closely related to development of the region's grain production. The level of development within the region during different periods has not been even. During the period of the First 5-Year Plan, when the region's grain increased 26 percent, the number of hogs in inventory increased correspondingly by 50 percent.

Between 1957 and 1962, when grain output dropped, the number of live hogs decreased 27 percent. Between 1963 and 1965 when grain increased 34 percent, the number of live hogs nearly doubled. Today the region's not very high level of grain production and its fairly low grain ration are major reasons impairing development of the hog-raising industry.

The region's plow oxen output has grown even more slowly. In 1979 the region had 320,000-odd plow oxen, and was bogged down at the level of the period immediately following liberation. Not only did the number not increase, but because plow oxen were overworked and exchanged among close relatives, their build became increasingly small and their stamina declined. Their ability to farm the land became ever lower. In today's situation of fairly low productivity, and particularly the not very high level of agricultural mechanization, plow oxen remain the major source of power in agricultural production. They should receive extremely serious attention and development.

This region has a large mountainland and hill area, numerous grassy mountains and hillsides. Full use of these superior natural conditions for energetic development of the raising of grazing animals such as cattle, goats and rabbits holds great promise for animal husbandry production. Selection of places having numerous grassy mountains and hillsides and having fairly good communications and transportation such as Quannan County, and then concentrating manpower, material and financial resources there for the building of beef cattle bases on a certain scale is feasible.

The underpinnings of this region's commune and brigade enterprises are fairly weak. In 1979, earnings from the region's enterprises amounted to less than 20 percent of total earnings from the three-tier people's commune economy, which was lower than in other agricultural regions. This region has a vast mountain area with plentiful wild plants of all kinds, and with a lot of materials left over from the felling of trees and the processing of timber. In addition, the region's industrial base is fairly good, and it has fairly strong technical forces. Conditions for development of commune and brigade enterprises in farming, breeding, gathering and processing are extremely superior. These advantages should bs used to the full to hasten development of commune and brigade enterprises.

2. Variations Within the Region

The incomplete similarity in this region's natural conditions and its socioeconomic conditions is reflected in its agricultural production in which variations are also relatively marked. The entire region may be divided into four subzones on the basis of these variations:

A. The central cash crop subregion. This is a rectangularly shaped area that is long from north to south and narrow from east to west, and that centers on Ganzhou. It includes Ganxian, Nankang, Dayu, Xinfeng, Yudu, Xingguo, Ruijin and Huichang counties, plus Ganzhou City. The

terrain rolls fairly gently, and it is made up mostly of a fairly large hill and plains area. Average temperature here is higher than in the other three subregions, being 18.5° or higher. In Yudu and Xinfeng counties, the temperature is especially high, averaging 19.5°C or higher each year. The amount of precipitation tends to be less than in other subregions. Nankang and Ganzhou counties (plus Ganzhou City) get the least with fewer than 1,450 mm. At the same time the amount of evaporation is fairly great at between 1,410 and 1,890 mm. Yudu and Xinfeng receive more than 1,800 mm. Within the subregion, destruction of forest vegetation cover has been substantial, and this is an area of severe erosion in the region.

This subregion has more than half the region's land area and population, and it is the place in the agricultural region in which farming and livestock raising is most concentrated. In particular, not only are cash crops the main crops in the region, but they also hold an important place in the province as well. In 1979, more than 580,000 mu were sown to cash crops throughout this subregion. This was 77 percent of the total area sown to cash crops in the entire south Jiangxi agricultural region. An overwhelming majority of the sugarcane, tobacco, cotton, jute, peanuts and rape that are grown are concentrated in this subregion, making this subregion a major producing area for cash crops. However, the region's current lack of complete self-sufficiency in grain has many disadvantageous consequences for development of cash crops. A fairly good basis also exists within the subregion for economic diversification in animal husbandry, sideline occupations and the fishing industry. The subregion produces 70 percent of the region's aquatic products and 59 percent of the region's live hogs. Commune and brigade enterprises have also developed fairly extensively. In the future, it will be necessary to take into consideration the province as a whole in carrying out further economic zoning and in finding an equitable solution to grain supply and apportionment, thereby giving impetus to making the most of a large area of cash crops, high yields and abundant technical experience in production. At the same time, building of forestry must be accelerated for genuine control of erosion, to change the natural landscape, to promote ecological balance, to insure consistently high yields of grain and cash crops, and to accelerate this subregion's development into a production base for cash crops in the province for cash crops such as sugarcane.

B. The northwestern forestry subregion. This subregion is located in the northwest in the foothills of the Zhuguang Mountains and adjacent to Hunan Province. It includes Suichuan, Shangyou and Chongyi counties. Its mountainland area is large, but its cultivated land area is small, cultivated land amounting to only 7.3 percent of total land area. Temperatures are fairly low, averaging between 17.9° and 19°C annually. Chongyi is the county in this subregion with the lowest average annual temperature, but it varies little during the year, only 20°C. It has many foggy days and few hours of sunshine, only 1,521 hours each year. Annual precipitation runs from 1,429 to 1,636 mm. Since elevation is fairly high, much rain falls in autumn when between 16 and 17 percent

of the total for the year falls, the most in the south Jiangxi agricultural region. The frost-free period is fairly long at approximately 291 to 309 days, which the other three subregions cannot match. The subregion has plentiful forests, making it a key logging area for the whole province. The forest cover rate is 66.5 percent and live timber reserves amount to 30.7 percent of the region's total reserves amounting to 25.53 million m^3 of which 9,416,000 m^3, or 45.2 percent of timber forest reserves are mature timber reserves. The percentage of overly mature forests is large; remnant, old, and secondary growth forests should be cut for transformation and renovation as manmade forests. The mature forests contain a high percentage of China fir trees amounting to 45 percent of total mature forest reserves, making the economic value of this region's forest trees fairly high. The subregion has a substantial tea oil forest area, with Suichuan County having the most. This is one of the major areas producing tea oil in the whole province. Forestry has broad prospects for development in this subregion, which should be used primarily for forests.

C. The southern forest and fruit subregion. This subregion includes Xunwu, Anyuan, Dingnan, Longnan and Quannan. It is located in the southern part of the agricultural region at the southernmost tip of the province. It borders on Guangdong Province on the north slope of Jiulian Mountain. This subregion has little cultivated land, which amounts to only 6.7 percent of the land area. The mountain area is large, accounting for 70 percent of the total land area. Though the "three souths" are at the southernmost tip of the province in terms of geographic latitude, since the subregion is located on the shaded slope of the Jiulian Mountains at a fairly high elevation above sea level, and since mountain ranges rise and fall in steady succession to the south of Xinfeng, temperatures are somewhat lower than in the central part. This subregion is the one in the whole agricultural region with the smallest relative difference in annual temperature. The difference is only 18.7°C, and total cumulative heat is high. This subregion is most affected by typhoons. The seasonal drought of every July and August is eradicated by typhoon rains, and the amount of evaporation is least of any of the three subregions. Live forest reserves amount to nearly one-third of total forest reserves for the whole agricultural region. It is one of the important forest areas. Overly mature forest reserves amount to 27.3 percent of timber reserves, and the percentage of middle age forests is 47.2 percent at maximum. It will soon become an important commodity timber base. Climatic and soil conditions in the subregion are pretty good, and sped of growth of China fir trees is faster than in other mountain regions. This region has also introduced some tropical economic tree species such as Acacia decurrens and star anise trees [Illicium vernum], but overwintering is fairly difficult for them. Quite a few of them froze to death in a large winter snowstorm during 1975. In the future, the planting of cold-tolerant species should be watched. Attention should also be directed to selection of small plots of land or sunny hillsides, and places that have shelter forests or high mountains that act as a screen for planting them. They might best be

planted midway up sunny slopes. Since cold air settles in low spots or at the bottom of ravines, if tropical tree species are planted there freeze damage will be much greater than at midlevel or at the top. Stocking of forests with lac insects has not succeeded because of over-wintering problems, and stocking was done for only a single season. This region's natural conditions are conducive to the growing of fruit trees such as oranges and tangerines. Citrus production has developed very rapidly, and a very great potential remains. Annual output in 1979 was 38,000 dan, 60 percent of which came from Xunwu County. Wenzhou honey oranges are the dominant citrus variety.

D. The northeastern grain crop subregion. This is composed of Ningdu, Guangchang and Shicheng counties. It is located in the northeastern part of the agricultural region in the western foothills of the Wuyi Mountains where some mountain peaks rise to more than 1,300 m. It abuts Fujian Province in the east. This subregion's climate is characterized by freezing winters and much rainfall, most of which is torrential rains. It is the center of torrential rains for the whole region. Annual temperature averages 18.1°-18.4°C. Since this subregion is located along the route of winter winds, temperature tends to be low, winter temperature being 7°C or less. Guangchang has a temperature of only 6.1°C. During the extreme lowest temperature in January, the temperature in Guangchang County reaches -9.8°C. It snows on an average of about 7 days in winter, more than in any of the three subregions. This is the subregion in the entire south Jiangxi agricultural region with the lowest cumulative temperature for days when the temperature is stabilized at 10°C or higher. Though much of the subregion is mountainlands, it is the subregion in the south Jiangxi agricultural region with the lowest forest cover rate. Live forest reserves come to only 9,936,000 m^3, which is 10.8 percent of the agricultural region's total reserves. Erosion is fairly serious in this subregion, the eroded area amounting to 1.18 million mu, second only to the central cash crop subregion. This sub-region is the major grain-growing area in the south Jiangxi agricultural region and has been dubbed the south Jiangxi "granary." Though yields per unit of area are currently fairly low, population is small relative to farmland and the grain crop area is large, so large amounts of marketable grain can be shipped out. In 1979, cultivated land in this subregion was 17.8 percent of the total for the whole agricultural region, but grain output was 18.1 percent of the total. Furthermore, the net amount of grain shipped was equivalent to 4.3 times the net amount of grain shipped after equalization for the whole agricultural region. In order to build this subregion into a commodity grain base in the south Jiangxi region, genuinely effective measures will have to be adopted to do a good job of farmland water conservancy construction for resolute control of erosion and to build a series of consistently high-yield fields as quickly as possible in a vigorous effort to raise yields per unit of area and increase grain output tremendously.

Third Section. Several Problems in Further Development of Agricultural Production

1. Problems in Multiple Uses of Mountainlands and in Erosion Control

This region is one of the key forest areas to have been built in China. At the same time, it is also one of the regions among all the southern provinces that has fairly serious erosion. Good performance in all-round use of mountainlands and strict control of erosion is of great significance for full tapping of the potential for agricultural production of this region, for hastening development of economically diversified production through farming, forestry and animal husbandry, for making the mountain region economy prosper, and for enriching the people's lives.

Statistics show an eroded area of approximately 8,600-odd (more than 13 million mu) sq km in this region. It is most serious in Xingguo, Ningdu, Ganxian, Nankang, Yudu, Xinfeng, Shicheng, Guangchang, Ruijin, Shangyou and Huichang counties and in Ganzhou City. Every commune in Xingguo, Ganxian, Nankang and Ruijin counties and in Ganzhou City, and 80 percent of communes in Ningdu, Shicheng, Guangchang and Yudu counties have erosion. The eroded area is largest and most seriously advanced in Xingguo and Ningdu counties. The eroded area here totals 4.3 million mu, or more than 32 percent of the eroded area in the whole region.

Erosion has affected agricultural production and peasants' lives in numerous extremely unfavorable ways.

First has been a decrease in the soil's ability to store water and an increase in drought disasters. Take Xingguo County where soil erosion is serious, for example. Statistical data show four flood and drought disasters as having occurred here between 1952 and 1957, an average of 1.3 per year, but during the 20 years between 1958 and 1978, there were 17 floods and 30 droughts, an average of 2.4 every year, virtually double the number. Today approximately 60 percent of the county's farmland is prone to waterlogging or drought, and 30,000 mu have basically turned into sand dunes. A cumulative total of more than 1.2 million mu of farmland in the county has been affected by flood or drought disasters since liberation, and more than 100 million jin of grain has been lost on this account alone.

Second has been the silting of mountain pools and reservoirs and the steady rise in river beds. Benefits from engineering projects have declined markedly and more and more shipping channels have become useless. In order to meet the needs in development of agriculture, this region had built many mountain pools and reservoirs since liberation. However, many of them have already been scrapped as a result of serious runoff of soil and water, and benefits from some projects have declined very greatly. Changgang Reservoir in Xingguo County is one of the province's large water conservancy projects with an originally designed capacity of 356 million m^3 of water for the irrigation of 70,000 mu. Today, however,

the actual irrigated area is less than 20,000 mu. Originally designed for 80 tons of silt a year, the actual inflow of silt today is more than 160 tons. Unless vigorous action is taken to reduce the amount of silt entering the reservoir, the reservoir's life will be very greatly shortened.

In addition, river beds have become higher than fields in many places in this region as a result of soil runoff. Statistics show the area of this kind of farmland alone to be approximately 400,000-odd mu, which is nearly 10 percent of all the cultivated land in the whole region. Tests conducted on the bed of the Ping River in Xingguo County show silting to a depth of 7 to 12 m, and scouring has widened the river banks by several hundred meters. Volume of flow in the river during the dry season is less than 3 m [units] but during a torrential rain it reaches 2,370 [units]. During the period immediately following liberation, the navitation channel through Xingguo County was 114 km long, and both junks and bamboo rafts could travel upstream to Zuolongjiang, Gaoxing, and such places, or could go downstream to Jiangkou and Ganzhou. Today there is no navigation channel anywhere in the whole county. As a result of rise in the river bed, Dongshanba Commune in Ningdu County is threatened with flooding. Five natural villages (more than 50 households) have been forced to move and five production teams (more than 200 households) are anxiously awaiting removal.

Third has been runoff of fertile soil and diminution of soil fertility that has forced peasants to farm more and harvest skimpier crops. For a long time agricultural production has been low and inconsistent. As a result of soil erosion, large amounts of fertile topsoil and mature soil have been washed away. Calculations based on testing have shown the nitrate, phosphate and potash washed away in soil as a result of erosion in the region each year to be about three of four times the amount of fertilizer applied throughout the region. This has led to a depletion of farmlands and not very high yields. Though the large population relative to farmland and plentiful labor throughout the region permits intensive farming, the speed of increase in gross output and yields per unit of area of grain has been lower than the average increase for the province as a whole since liberation.

Fourth is a heavy labor burden for commune-member masses, and a fairly hard life. In eroded areas, most mountains are bald; fields are infertile and prone to both flooding and drought, and production is rather undiversified. Not only is it necessary to spend large amounts of labor on control of erosion, but because of a shortage of the three materials (fertilizer, fodder, and fuel), the masses of commune members must spend a large amount of labor annually on sending people great distances to collect manure, to fetch firewood, to collect fodder and to pasture livestock. A survey done in Xingguo County shows that between approximately 20 and 30 percent of the total labor force is used annually for just this kind of work, which has become an onerous burden on the masses of commune members in eroded areas. Because of the heavy burden on the work force, increases in yields bring no increases in income, and everywhere the masses live in hardship.

There are many reasons for the erosion. A look at natural reasons shows that most of this region's seriously eroded areas are in low mountain and hill regions between 200 and 500 m above sea level. These regions are composed mostly of metamorphic rock systems and granite, and in granite rock areas, in particular, the weathered residuum is fairly thick and plant cover sparse, making such areas extremely prone to scouring by mountain waters. In purple shale areas, in particular, since the rock is fairly hard, the soil layer thin and the plant cover destroyed, revival will be difficult within a short period of time. As a result of the devestation caused by the "burn all, kill all, loot all" policy that the Kuomintang reactionary clique pursued for a long time from the time of the second revolutionary civil war, large expanses of forests were destroyed and the scars remaining are extremely deep. Though great efforts at control have been made at control since liberation, the situation has been complicated by frequent changes in mountain forest ownership rights. This plus shortcomings and mistakes made in work, particularly the large-scale expansion of communes and merger of brigades carried out by Lin Biao and the "gang of four," and their instigation to anarchy has resulted in seriously reckless cutting and denudation of mountain forests. This destroyed forest cover, which was a fundamental reason for the serious soil erosion. Furthermore, there has been a proportional imbalance among farming, forestry and animal husbandry in actual work for a long period of time. Forestry has emphasized logging while slighting afforestation. Too much cutting of forests has been done. Because this region's coal reserves are slight, and since the coal needed for fuel in the people's daily lives and in production has been lacking, much cover has been cut down and burned as fuel. There has also been ill-advised clearing of land for agriculture, reckless digging up of turf and extraction of minerals, and building of roads, with insufficient concurrent attention being given to water conservation, and this has intensified erosion to varying degrees.

A good job of using this region's mountainland resources in a comprehensive way and strictly controlling erosion is an urgently pressing task in the current building of the region's agricultural production. Multiple measures must be taken for farming, forestry and animal husbandry, comprehensive planning done, close coordination effected, and joint action taken to tackle problems in an all-round way. A firm grip must be taken on the following matters:

A. Rational land use on the basis of the characteristics of mountain regions. This region has a large population relative to cultivated land and a large mountainland area, so the conflict between land use and the conservation of soil and water has always been a prominent one. Numerous inequities existed in land use in the past as a result of both the long rule of the reactionary class, as well as the effects of the small-scale agricultural economy. On the one hand, many places did not base the percentage of land used for farming, forestry and animal husbandry, or the use of hillsides on concrete circumstances, nor did they plan in a unified way. As a result, in order to grow more food,

raise more livestock, expand production, or increase income, the masses in many places did not hesitate to clear steep slopes in a reckless manner, thus giving rise to serious soil erosion. The land was destroyed and the gains were not worth the loss. On the other hand, as a result of the lack of a concrete program in some places for linking farming, forestry, animal husbandry and water use in different areas, and the lack of a clear division of labor and close coordination under unified planning, frequently water and soil might be conserved in one place while wasteland was ill-advisedly cleared with destruction of soil and water conservation in another. All these problems must be solved through diligent investigation and study plus comprehensive planning. Future rational planning of the use of all land will have to be done on the basis of natural conditions, such as elevation, gradient and direction of slope of land in mountain regions, and on the basis of difference in manmade condition, such as farming, pasturing, gathering of firewood and digging up of grass. The most economically effective measures for soil and water conservation will have to be adopted so that this region's plentiful soil resources will both yield their full production potential and benefits will be received from a halt to soil erosion.

In order to use soil in the most equitable and most effective way, flat land and gently sloping land suitable for farming at below 300 m above sea level should generally be used mostly for the growing of grain and cash crops since water and heat conditions there are fairly favorable, and since they are close to human habitation and can be managed readily. In places close to inhabited sites, some firewood forests should be built as well in order to solve the problems of the masses in getting firewood. High hill regions between 300 and 500 m above sea level should be mostly used for economic forests consisting of tea oil trees, fruit trees, Chinese chestnuts and cassava. Some places may also be used for natural grazing. Mountainlands above 500 m with a slope greater than 25 degrees should not be farmed, but should be used primarily for the growing of timber. Poor-quality farmland should be planted to fast-growing green manure or fodder grass that will both cover the ground to prevent soil erosion and produce fodder, fertilizer and fuel at the same time. This will help develop animal husbandry production and increase farmland yields.

Since this region has always been a grain-short one and since communication has not been easy and transportation difficult, full consideration should be given to the urgent needs of the masses for an increase in grain output when deciding the goals of land use. In addition to efforts to increase yields per unit of area from the existing cultivated land area, where conditions permit, the cultivated land area should also be expanded as feasible. However, the clearing of slopes for use should be undertaken only insofar as water and soil can be effectively conserved. Clearing of steep slopes with a more than 20 degree gradient should be prohibited. When it is necessary to clear steep slopes with a gradient of more than 20 degrees in order to look after the livelihood and production of the masses in places having little land relative to

population, permission must be obtained, and terraced fields made. Existing cultivated land with a slope of less than 20 degrees should be terraced; alternatively contour ridges should be built or strip cropping done. Where water and soil runoff is already serious and the "three materials" are lacking, more green manure, pasture grass and bushes should be grown in order to raise more livestock and increase the amount of manure to increase grain production. In order to conserve water and soil in a few places where serious washing away of soil and water has resulted from reckless clearing of steep slopes, it will be necessary to abandon cultivation to allow theland to revert to forests or to livestock raising.

It should be pointed out that since the amount of arable land is small in mountain regions, sole reliance on farming will be far from able to solve the problem of the standard of living of the masses. On the other hand, mountain regions have extremely superior conditions for development of forestry, animal husbandry and sideline occupation production. Many mountain forest specialties such as medicinal herbs, fruits, furs and forest byproducts are an important source of income for mountain region people. Thus, planning of mountain region production should be based on the principle of equitable use of natural resources and suiting of general methods to specific circumstances, doing rational planning of farming, forest, animal husbandry and sideline occupation production, and planning in a comprehensive way in order to use to the full the maximum potential of mountain land to produce.

B. Suiting of general methods to specific circumstances and suiting preventive measures to the dangers to be faced, applying both engineering and biological measures. This region has vast mountainlands and its topographical conditions are complex. Both natural and socio-economic conditions vary from one place to another, and the reasons giving rise to erosion are also not entirely similar. Thus, in taking action to cure root causes, general methods must be adapted to specific circumstances, the emphasis shifting as required. In places in which agriculture predominates, serious attention must be devoted first to improving agricultural techniques that conserve water and soil, such as widespread use of deep plowing to a sensible depth, planting across slopes, cultivating after rains, and increased use of organic fertilizer as means of moderating the slope of the ground surface, improving soil structure, increasing soil porosity and conserving moisture. Farming methods that use crop rotation, intercropping and companion cropping for conservation of soil and water should also be promoted in order to increase the ground crop cover to the maximum extent possible, to disperse and reduce runoff, and to conserve soil and water. Practice has demonstrated that of all measures for conserving water and soil, improvement of agricultural techniques and farming methods are the simplest and most workable. The broad masses of this region already possess many successful experiences in these regards as a result of numerous years of production, and these experiences should be summarized, improved upon and vigorously promoted.

Simultaneous with improvement of farming techniques should be a meshing of necessary engineering methods with biological methods based on natural conditions in each area, tackling of mountains, waters, fields, forests and roads in a comprehensive way, and linking work on ravines to work on slopes.

1. The granite rock weathered area: The first thing required in severely eroded mountainlands is the leveling of the tops of mountains to place a cap on them. This means either building flat terraced fields or open ponds on mountain tops. Horizontal ditches should be the main feature halfway up mountains with a slope of under 25 degrees. For slopes between 15 and 25 degrees, level terraced fields should predominate. Slopes of less than 15 degrees may be reclaimed for the building of fields. In the case of fairly deeply eroded ravines, check dams may be built at several levels. For mountains with a moderate amount of runoff with a slope of less than 15 degrees, engineering methods used may include "leveling of mountain tops, blocking mountain slopes, and filling in ravines. For slopes of less than 15 degrees, reclamation for the building of fields should predominate. Either economic forest trees or farm crops may be planted. For mountains with slight runoff, the mountains should mostly be closed to people and trees grown.

2. The purple shale area and weathered conglomerate area: For mountains with a serious and moderate amount of runoff with a slope of more than 20 degrees, afforestation should be most important. Groups of check dams should be built in eroded ravines. Slopes with a gradient of less than 20 degrees may be dynamited or built by human labor into flat terraced fields. Mountains with a slight runoff may be treated in the same way as weathered granite rock runoff areas.

3. The quarternary red earth runoff area: Since slopes are gentle on mountains in this type of runoff area and the soil layer relatively thick, though lacking in organic matter, runoff may be handled through the building of level terraced fields.

4. Treatment of collapsed downlands: Elongated collapsed downlands resulting from changes wrought by erosion of ravines may be handled through check dams at many levels to store water. The top levels would be used mostly to hold back silt, and the lower levels would be used mostly to hold water for irrigation. Protective measures such as spillways and ditches should be built, and drainage ditches should be built on the tops of downlands.

5. Treatment of scouring by streams: For gourd-shaped collapsed downlands on river banks, protective dams should be built to protect slopes to force a change in the course of the main runoff.

A combination of engineering and biological measures should be pursued. Close followup with biological measures should be done on all mountain tops on which engineering measures have been completed, engineering measures helping biological measures alone, and biological measures

protecting engineering measures. In weathered granite rock areas, mountain tops are suited to the growing of shrub lespedeza and masson pines. Shrub lespedeza, masson pines, Schima superba, Chinese sweetgum, and tea oil trees are suitable for planting around the middle of mountains, and these trees may be intercropped with Crotalaria mueronata, soil-enriching radishes, Chinese milk vetch, peanuts and soybeans. Yellow bamboo, paulownia trees, China firs and tea may be grown at the foot of mountains, and wetlands may be build where conditions permit. In purple shale areas, shrub lespedeza and sesbania may be grown outside of embankments, and yellow sandalwood [Dalbergia hupeana] and Chinese sumac may be grown within embankments. Places with gentle slopes may grow economic forest trees such as persimmons, dates or pears. Quarternary red earth runoff areas are suitable for the growing of citrus, tea, Chinese chestnuts, cassava, tea oil trees, and tung trees, which may be intercropped with green manure, peanuts or pulse crops. Once collapsed downlands have been taken care of, they may be planted to yellow bamboo and paulownia.

It should also be realized that since this region has a warm climate and a substantial amount of rain, and since vegetation revives very rapidly, some places remain green all year round, so fodder, fertilizer and fuel are fairly plentiful; a good foundation also exists for forestry production, and conditions are also extraordinarily advantageous for development of animal husbandry production. Consequently, water and soil conservation methods should be closely linked with development of farmland irrigation endeavors for steady expansion of the consistently high-yield farmland area from which a crop may be harvested despite drought or floods. In addition to building terraced fields, there should be large-scale building of small dammed pools and small reservoirs in order to set the stage for all-round development of farming, forestry, animal husbandry, sideline occupation and fishery production.

C. Energetic efforts to develop forestry production through a combination of stopgap measures and permanent cures. Energetic efforts to expand the planting of trees for afforestation and good performance in building forestry are ways in which to use mountainlands to the full, and to link present and long-range benefits. They are the most economic and most effective ways in which to prevent the cure soil erosion at its source. The planting of forests on mountain slopes is more natural and more in keeping with the interests of the masses of people than any other method, and it can attain more, faster, better and more economical results in the conservation of water and soil. Since forests are the best conservers of water, they can both prevent floods and prevent drought, and are "reservoirs" that can be built at the cheapest cost. A look at the situation in some countires of the world shows where the forest cover rate is more than 30 percent and is evenly distributed, it can regulate the climate, lock up sources of water and conserve water and soil for a great reduction in natural calamities. Though this region's forest cover rate is not low, forests are unevenly distributed. Many seriously eroded places still have bald mountains and naked stretches of land. In order to hasten the greening of barren mountains, control the runoff of soil and water, fundamentally cure flood and drought calamities,

enlarge the forest area, increase peasant earnings, and fundamentally change the face of these places, it will be necessary to link a mass movement with a specialized corp, and to link state-administered afforestation with collective afforestation by communes and brigades in the large-scale planting of trees for afforestation. Any place that has a fairly large barren mountain or wasteland area suited to forests should suit general methods to specific circumstances to operate commune and brigade forest farms and state-owned forest farms and persist in a program founded on forest management to place afforestation, the tending of forests and expansion of forest resources in first place both in order to fulfill the task of water and soil conservation and to produce timber for the country.

In the building of water and soil conservation forests, best results are obtained from the use of a mixture of coniferous and deciduous trees and multiple layers of vegetation cover. Planting of nothing but masson pine forests not only makes it easy for insect pests to grow, but few dead branches and leaves fall, so little is done to improve the soil. When a mixture of coniferous and deciduous trees are planted, however, not only are coniferous tree saplings shaded by broad leaf deciduous trees, which promotes their growht, but deciduous trees shed many dead branches and leaves. After they have rotted, they increase the soil's organic matter. In addition, as a result of the interaction of several layers of vegetation cover, when torrential rains occur, water and soil runoff is miniscule.

In order to control water and soil runoff effectively, in addition to energetic efforts in the planting of trees for afforestation, it is even more important that extreme attention be given to the protection of existing forestlands so that they will be felled in a rational way. In the case of watershed forests, in particular, mountains must be strictly closed off to provide protection, and arbitrary cutting positively prohibited. Nurture and management of existing spare forestlands and young forests must be intensified for their earliest possible transformation into forests that have a multiple layered vegetation cover. Mountainlands wereh erosion is already moderate, intense, or dramatic and in which forest trees grow extremely slowly everywhere because of the complete destruction of vegetation cover should particularly be closed off so forests can grow until the problem has been solved. Fuel forests and grassy mountains used for fuel should also be closed off rotationally as circumstances require in order to hasten revival of plant cover. The growing of grass or promotion of the growing of bushes that tolerate infertile soil, such as false indigo or shrub lespedeza, or beans, such as Crotalaria mucronata, should also be encouraged. These would both increase the cover on barren slopes and increase output of fodder and green manure.

In places where erosion is serious, in order to look after the masses' present welfare and solve effectively both the firewood problem and the problem of digging up grass for composting into fertilizer, every effort should be made to develop methane gas production, small coal mines, small

hydropower facilities and small chemical fertilizer plants. In addition, in building forests for the conservation of soil and water, large-scale use should be made of rapid-growing varieties of shrubs and bushes in order to solve the masses' firewood problem first within a short period of time. Furthermore, in order to change the poverty-stricken and backward appearance of these places, general methods will have to be suited to specific circumstances and various measures for water and soil conservation combined with vigorous development of economic forest trees such as tea oil, tung, Chinese chestnut, Chinese tallow, tea and silkworm mulberry, both to help communes and brigades carry out economic diversification and to increase the masses' earnings.

2. Problems in Hastening Development of Grain Production

This region has a large population relative to cultivated land. Vigorous efforts to develop grain production to solve the people's food problems is the paramount task in the building of agricultural production. Though substantial development has taken place in this region's grain production since liberation, it must be realized that as a result of fairly rapid population growth, increase in grain production remains unable to meet the needs for a steady rise in the people's standard of living and development of the national economy. Today, the grain ration in this region averages only 642 jin per capita of population, much lower than the average (803 jin) for the province as a whole. Clearly effective action to hasten development of grain production and to promote development of national economic construction is an extremely important problem in building this region's agricultural production.

A look at this region's natural conditions and resources shows that though there is a certain amount of wasteland that may be reclaimed for use, in most cases such reclamation would come into serious conflict with water and soil conservation. The amount by which cultivated land can be increased is limited, after all. In addition, as building of the national economy continues to develop, it will be necessary to take over some cultivated land for capital construction; thus accelerationof this region's grain production must begin with tremendous increases in grain yields per unit of area.

A. Harnessing Waters and Improving the Soil; Transformation of Low-Yield Fields

Harnessing of waters and improving the soil, good performance in famland capital construction, and vigorous transformation of low-yield fields are keys to increasing grain yields per unit of area. The level of farmland capital construction in this region is still not high today, and a very long way from the requirement of 1 mu per capita of consistently high-yield farmland. Large expanses of low-yield fields exist in the region. Statistics show more than 300,000 mu of low-yield waterlogged fields, and the area of yellow clay fields caused by runoff of soil and water is even larger. Improvement is urgently needed. First it is necessary to formulate genuinely effective basinwide plans

for tackling mountains, waters, fields, foresrs and roads in a comprehensive manner with the goal of controlling water and soil runoff and building consistently high-yield fields. Right now problems with not fully completed reservoir and irrigation ditch systems, not very high quality projects, and serious leakage must be solved in order to make fullest use of irrigation benefits to be derived from existing water conservancy facilities. Management must be strengthened, water used scientifically, and the irrigation area enlarged. Next, the transformation of low-yield fields must be taken firmly in hand. General methods must be suited to specific situations for different types of low-yield fields and different methods for transformation adopted as follows: Low-yield cold waterlogged fields are found mostly in ridged fields in hill regions, in sinkhole fields in mountain regions, and on large flat fields near the foot of mountains. Since the ground water table is high under cold waterlogged fields causing them to accumulate water all year round, and since the temperature of the water is low, the method that should be adopted is "boring in and dissecting the abdomen." This should achieve fine results. Low-yield yellow clay fields are mostly found in low mountain and hill regions, and the organic content of their soil is fairly low at only 1 to 2 percent. These fields and wet clay fields are the most widespread kinds of wetland fields in this region. These kinds of soils are found in approximately 70-odd percent of the wetland area. The pattern of their evolution is as shown in the table provided subsequently. Clearly, when runoff is serious, yellow clay innundates fields and fertile black clay soil evolves into low-yield yellow clay soil. On the basis of this pattern of evolution, people can act to increase the amount of organic fertilizer, mix in sand, or farm intensively. This will gradually change the soil into fertile black clay soil. In addition, sandy clay soil, leathery sand, and zhugan [3727 5134] soil are also low-yield soils in need of improvement. However, they do not cover very large areas for the most part.

B. Suiting of General Methods fo Specific Circumstances for Rational Changes in the Farming System

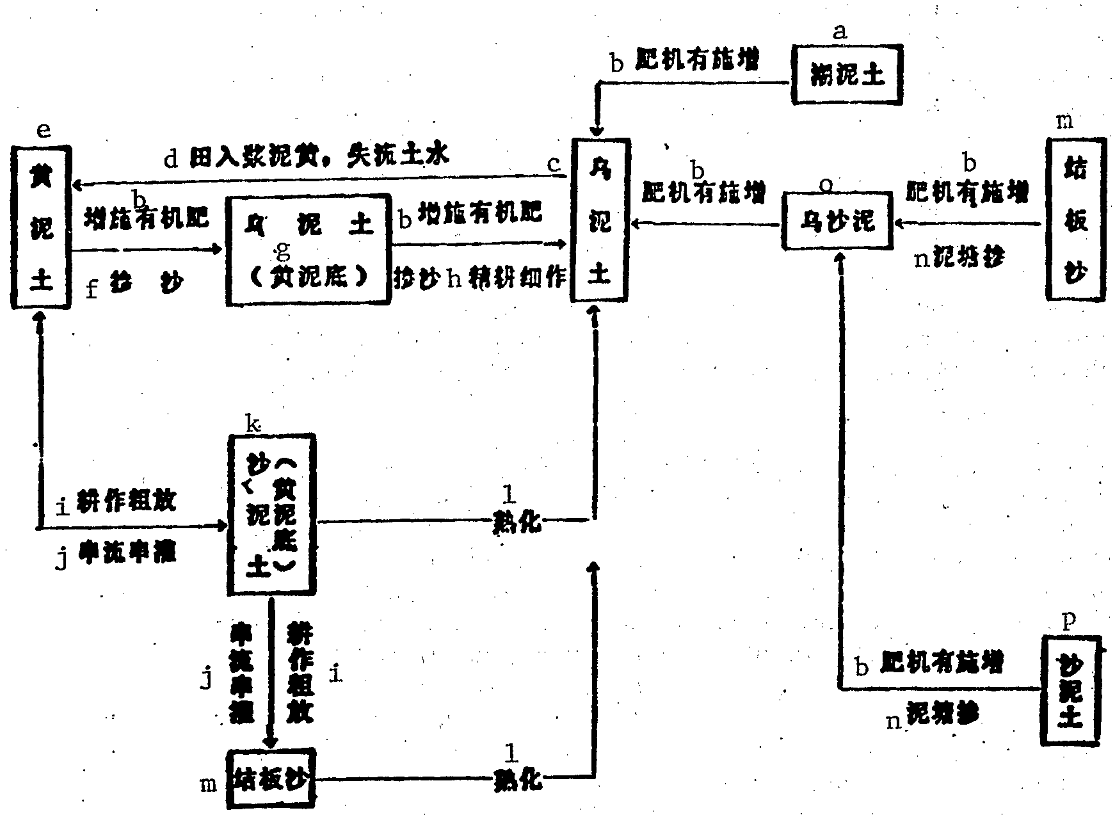
This region is located at a southerly latitude where water and heat conditions are superior. Historically it has always been accustomed to growing double crops of paddy. In 1948, prior to liberation, 32.5 percent of the total wetland area was a double-crop paddy area. After liberation, as the water and fertilizer situation improved, and the size of the work force increased, the double-crop paddy area increased to 69.4 percent of the wetland area, and three crops each year became the dominant farming system in the region. Today the farming system in areas producing grain is as follows: Rape-double crops of paddy; broad beans or peas-double crops of paddy; green manure (either Chinese milk vetch or fixed enriching radishes)-double crops of paddy; wheat-double crops of paddy; rape-early paddy-soybeans. The greatest percentage is either green manure-double crops of paddy or rape-double crops of paddy. The major problem today is expansion of the double crops of paddy area. Because of the growing every year of rape-paddy-paddy or green manure-paddy-paddy in an undiversified multiple-cropping system, it is

impossible to rotate between wetlands and drylands. As a result, the organic matter in the soil cannot decompose, the soil structure takes a turn for the worse, insect pests increase and fertility declines to the impairment of yields. Looked at in terms of soil use and soil nurture, this region long ago instituted a traditional system of rotation between wetlands and drylands of early soybeans and late paddy, which overcame problems with the growing of continuous crops of paddy. This should be revived and expanded.

In areas growing cash crops, where the farming system is fairly complex, the pattern is largely as follows: double crops of paddy-sugar-ane-peanuts; double crops of paddy-sugarcane-jute in a 5-year system of crop rotation, and green manure-jute-peanuts; green manure-jute-sweet potatoes; tobacco-late paddy, or else sweet potatoes-rape or green manure in a three-crop system. A two-crop system is also used of tobacco and sweet potatoes; rape and peanuts; or broad beans and sweet potatoes. The growing of sugarcane-peanuts-paddy, or tobacco and late paddy in a system of rotating between wetlands and drylands can promote high yields from both grain and cash crops alike. Growing of perennial sugarcane for 3 years in a row followed by 1 year of peanuts is good. If jute is grown, many missing seedlings result; growth is poor, and yields are not high. If paddy rice is grown, plowing becomes difficult because of a fairly large number of remnant root systems remaining in sugarcane fields that do not rot easily. They also impair paddy growth. Such fields are suitable for the growing of peanuts whose plants thrive and produce high yields. The reason is that when the remaining sugarcane root fibers decompose, they take nitrate from the soil with the result that jute and paddy do not grow well. Peanuts, on the other hand, can use root nodules to provide nitrate so they are not affected. After the peanuts have been harvested, paddy is planted, and even if little fertilization is done, the paddy grows quite well. But if dryland crops such as sugarcane or jute are grown, there will be many missing seedlings and missing plants in stands. In addition, peanuts cover a large area in which insect pests can readily hide to damage young sugarcane buds and young jute seedlings occasioning large losses of seedlings. But once paddy has been planted, many underground insects are killed as a result of the flooding of the fields with water. A substantial nitrate is left behind in peanut fields that causes the following crop of green manure to grow luxuriantly to provide early rice with abundant source of fertilizer. When tobacco and late paddy are rotated as crops, not only does the late paddy produce high yields, but diseases and insect pests are fewer. This is because much fertilizer is used for the growing of tobacco, and most of it is cake fertilizer of high quality. A considerable amount of this fertilizer remains in the soil. Deep furrows and high ridges are used in the growing of tobacco to promote the decomposition of organic matter in the soil, to improve soil structure, and to make the soil friable and not leathery. Once tobacco roots have rotted, they play a role in restraining diseases and insect pests (particularly rice borers), as well as weeds. However, tobacco and paddy currently compete for land and much of the tobacco growing has been forced to move to downlands where

the farming system is tobacco-sweet potatoes-peanuts. General methods must be suited to specific circumstances and measures adopted for equitable readjustment of the proportional relationship between cash crops and grain crop production for high yields of both grain crops and cash crops.

Pattern of Evolution of Yellow Clay Soil System



Key:
- a) Wet clay soil
- b) Increased in fertilization with organic fertilizer
- c) Black clay soil
- d) Water and soil runoff with yellow soil entering fields
- e) Yellow clay soil
- f) Mixing in of sand
- g) Black clay soil (yellow clay base)
- h) Mixing in of sand, and intensive care
- i) Nonintensive farming system
- j) Irrigation by channel water along furrows

[Key continued from previous page]

k) Sandy clay soil (yellow clay base)
l) Maturation
m) Leathery sand
n) Mixing in of pond mud
o) Black sandy clay
p) Sandy clay soil

In mountain regions with their vast area, the growing of two crops of paddy must be curtailed and the area planted to a single crop of hybrid paddy. This region has a large percentage of mountainlands, so good performance in mountain region grain production is extremely important. At the present time, the growing of two crops of paddy in mountain regions has spread to about 500 m above sea level, however, yields are fairly low, largely because labor is scarce in mountain regions with the result that farming is done nonintensively. In addition, there is a shortage of organic fertilizer. Rarely is any base fertilization done for the second crop, so paddy yields are not high. In addition, the late crop is prone to "cold dew winds," so yields are very inconsistent. Consequently, given present mountain region production conditions, choice of a hybrid species to change to the growing of one intermediate or one late crop is best, with every effort made to increase yields per unit of area and to derive more from a single crop of hybrid than from two of conventional rice.

A three-crop farming system of wheat (or rape)-paddy-paddy may be promoted as feasible in places having requisite conditions. This region has ample heat conditions for doing this. Some plains areas such as Yudu, Xinfeng, Nankang and Ganxian have a cumulative temperature of approximately 2,200°C between early November until the end of April of the succeeding year, sufficient to meet the needs of wheat for heat from sowing until ripening. In small-area plantings of a three-crop system of wheat-paddy-paddy, yields of more than 1,500 jin per mu and even a record high yield of 2,200 jin were obtained. In central plains areas where farmland is scant relative to population, labor fairly plentiful, and water and fertilizer conditions good, general methods may be suited to specific circumstances in the future promotion of a three-crop farming system consisting of wheat-paddy-paddy for an increase in grain output and a rise in the self-sufficiency rate for grain. However, the following several problems will have to be solved. First, much effort will have to be devoted to the propagation of superior varieties suited to this region that ripen early and tolerate wetness. Second is development of farm machinery to solve the acute labor shortage that results from harvesting one crop while sowing its successor. Though this region has much labor, at the time one crop is harvested and another planted, labor is in extremely short supply. For example, the Dapingnao Production Team in Lingbei Commune, Yudu County test planted 2.4 mu in a three-crop system of wheat-paddy-paddy, sowing the wheat on 16 November and harvesting it on 25 April. It sowed early paddy on 28 March and transplanted seedlings on 29 April. The interval between the harvesting of the wheat and the transplanting of the early paddy seedlings was only 4 to 5 days. The

early paddy was harvested on 21 July, but the late paddy had been sown on 21 June and transplanted on 21 July, so there was only 1 week's time between the harvest of the early paddy until the transplanting of the late paddy [sic] [presumably the late paddy was transplanted on 28 July, not 21 July]. The late paddy was harvested on 29 October, just slightly more than ½ month after the wheat had been sown. Clearly planning of the succession of crops in a three-crop system of wheat-paddy-paddy is extremely hectic. If mechanization of harvesting, transplanting, plowing and harrowing are not solved, seasonal delays may result that impair yields. Furthermore, wheat harvest time coincides with the rainy season, so research must be conducted to solve the problem of wheat grains molding when they get damp.

In addition to taking a firm grip on the foregoing two measures, general methods will also have to be suited to specific circumstances to carry out all the other measures for increasing yields stipulated in the "Eight-Point Charter" for agriculture. In short, it is necessary to institute scientific farming in a comprehensive way in order to vigorously increase yields per unit of area.

3. Problems in Building Sugarcane Bases

Sugarcane production is a major economic advantage this region enjoys. Not only is the growing area large and yield high, but the sugar content of the cane is markedly higher than in other regions of the province. Full use of this region's advantageous natural and geographic conditions and plentiful technical experience in production to hasten development of sugarcane production and build this region into a sugarcane production base in the province with all possible speed is a major matter that cannot be overlooked in building the national economy and making full use of the region's economic advantages. Strengthening the building of the region's sugarcane bases will require a firm grip on the following several matters:

A. Raising of yields per unit of area as the main direction of attack. This region's cane area has increased substantially since liberation. Today, yields per unit of area are not high, averaging only slightly more than 3 tons per mu. Major future efforts will have to be directed to increasing yields per unit of area as the main orientation in this region's development of sugarcane production. Improved varieties is one of the effective measures for increasing yields per unit of area. The dominant sugarcane varieties used in this region today are Gahzhe Nos 1 and 8. These varieties have approximately 16 percent sugar content, which is higher than for Taitang No 134. Yields run between 5 and 6 tons per mu, or between 7 and 8 mu at most, lower than for Taitang No 134. New sugarcane varieties will have to continue to be bred in the future, and they will have to maintain present sugar content while producing high yields per mu. Farming methods should be improved, including a change from setting out single stalks to setting out double stalks and winning high yields by having buds that will assure shoot growth, seedlings that will assure stalks, and single stalks that are heavy.

Shortening of the distance between rows in the practice of close planting to increase the land-utilization rate and increase the number of effective stalks per mu is also an effective measure for improving yields per mu. Autumn and winter growing of sugarcane should also be vigorously developed to increase sugarcane yields per unit of area. Promotion of the autumn growing of sugarcane holds the following advantages: Planting when autumn temperature is above 20°C will mean completion of budding and emergence of shoots, tillering and entry into the 3- to 6-leaf growth stage before the advent of frosts and freezing. After overwintering, growth will begin in spring of the following year for a long effective growth period and early maturation. Maturation can be advanced by 11 to 15 days in this way, and sugar content can be increased by approximately 1.5 percent. Yields can be increased by 20 to 30 percent, or even more than doubled in maximum cases. Take the experience of the Tangnan No 5 brigade of Nankang County in the growing of 20 mu of Ganzhe No 8. Cane planted in autumn yielded an average 6 tons per mu, 30 percent more than cane planted in spring. Dukeng Brigade in Xiadu, Xingguo County got yields of 3.8 tons per mu from autumn cane versus yields of 3.8 tons per mu from spring cane for a 110 percent increase. Autumn sugarcane may be intercropped with late-crop sweet potatoes, late-crop soybeans, or late-crop paddy, which is one way in which to increase grain output. Furthermore, since autumn sugarcane need not be planted in cellars, the amount of planting may be reduced for a saving of labor. However, during overwintering, autumn sugarcane must be protected against freezing. Finally, increased fertilization and scientific fertilization are also effective ways in which to increase yields per unit of area. There is an extreme shortage of organic fertilizer in the region that works against increases in sugarcane yields per unit of area. The raising of livestock anmmimals such as hogs must be vigorously developed to solve the farmyard manure problem, and sources of fertilizer must be enlarged by collecting dung and converting cooking stove dirt to fertilizer. Fertilization must be done properly on the basis of the growing stage of the sugarcane. For example, during the period between the grain rains and beginning of summer [around 20 April - 5 May] sugarcane fields are hilled up and fertilized for the first time. This is just the time when sugarcane needs fertilizer, but this is also the time when rice seedlings are being transplanted and labor is in extraordinarily short supply, thus leaving no time to fertilize the sugarcane. As a result, sugarcane root development is thin and small with the result that when branches and leaves flourish later on, they will not receive sufficient moisture and nutrients and yields will be reduced. Facts have shown genuine adoption of the foregoing practices can mean a tremendous increase in sugarcane yields per unit of area.

B. Rational planning of grain and sugarcane proportions. As in the case of other cash crops, the growing of sugarcane in concentrated areas offers numerous advantages. It is easier to care for, lends itself to mechanized operations, produces high yields and can be readily hauled. As far as the sugar-refining industry is concerned, the more concentrated the growing area, the better in order to shorten hauling distances and reduce loss of sugar content. However, overconcentration also brings in

its wake a shortage of labor and disadvantages for linking soil use and soil nurture. Consequently, rational planning of the percentages of grain and sugarcane to be grown is extremely important. Sugarcane growing in this region is concentrated mostly along the shores of the Zhang River, the Gong River and the Gan River, which are mostly fertile, alluvial sandy loam areas. For a long time, it has been grown with paddy in a system that has rotated the growing of wetland and dryland crops. In machine-crushing regions today, sugarcane fields take up more than one-half of the wetland area. The Chongwen Production Brigade in Longhua Commune, Nankang County uses 54 percent of its wetlands as canefields. When other cash crops, such as peanuts and jute, are added in, the dryland crop area reaches 65 percent, and as much as 70 to 80 percent in some places. Historically, the overconcentration of cash crops has posed difficulties for traditional crop rotation between wetlands and drylands, with the result that cash crops could only be continuously cropped, and this increased diseases and insect pests, made the soil leathery, and hurt efforts to increase yields per unit of area. It also brought about an overconcentration of labor at the same time. Under most circumstances, work is very hectic each year from right after the time of excited insects [around 5 March] until just before the limit of heat [around 23 August]. Sugarcane is harvested between beginning of winter and the time of little snow [around 7 - 22 November] when the demands on labor are at their greatest. Often yields suffer as a result. We believe that given present production conditions, that growing sugarcane on about one-third the wetland area, and certainly no more than 40 percent, is about right. If other cash crops are added to the canefield area, the total area should not be more than one-half the wetland area. This would make crop rotation between wetlands and drylands possible so that soil nurture and soil used could be linked and the soil's fertility maintained. It would also ameliorate the labor shorage. Surveys show that when the area for cash crops is about half the wetland area, the seasonal allocation of labor is fairly balanced. Otherwise, busy and slack times for labor are not even and allocating labor is difficult. This holds major significance for increasing grain yields and increase the grain self-sufficiency rate in areas growing sugarcane.

C. Earliest possible solution to the sugarcane hauling problem. Readily available transportation is a major requirement for development and distribution of sugarcane production. The historical growing of sugarcane along rivers in this region has been related to the readily available water transportation. Truck transportation holds advantages in being fast and on time with little loss of sugarcane sugar content, while water transportation is slow and loss of sugar content is great. In addition, the season for transportation of sugarcane happens to coincide with the low-water season, making transportation difficult. As a result, the percentage of sugarcane carried by water transportation has gradually declined until today when approximately 20 percent of it goes by water. Trucks have become the main method for transportating sugarcane in this region. A look at the present scale of sugarcane production in this region shows that if crushing is done for 100 days from the outset of

the crushing season each year, a fleet of between 160 and 170 trucks will be required to haul the cane. The main problem today is the dispersal of cane fields in machine-crushing areas. Take the Nos 1, 2, and 3 sugar refineries in Jiangxi, for example. The production team canefield that is farthest from No 1 sugar refinery is 33 km away; canefields are fairly concentrated. No 2 refinery's canefields are farther away, some as far as more than 40 km. Once cane has been cut, it frequently loses sugar content because it cannot be hauled away promptly.[2] Surveys show that sugarcane from some production teams loses as much as 0.12 tons per mu of sugar content, or as much as from 3 to 5 percent, because it cannot be hauled away. Clearly, canefield patterns should not be too spread out. In general, they should be located within a 20 km radius of a sugar refinery. Secondly, most existing highways are not up to standard; quality is poor, and vehicles break down a lot. Transportation capabilities are low. Appropriate action should be taken to upgrade highway quality. Authorities concerned should do overall planning taking all factors into account and assign more trucks to sugarcane areas as feasible in order to increase transportation capabilities.

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2 In general, during the first week after cane has been cut, the rate at which it loses sugar is 1 percent per day. After 1 week, the rate of decline in sugar content is multiplied and after 10 days the sugarcane becomes "firewood."

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